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THE LYNX SPIDERS OF NORTH AMERICA,
NORTH OF MEXICO (ARANEAE: OXYOPIDAE)

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No. 13. — *THE LYNX SPIDERS OF NORTH AMERICA,
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¹ This study was presented to the Department of Biology at Harvard University in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

INTRODUCTION

The family Oxyopidae comprises 371² described species distributed chiefly throughout the tropical and subtropical regions of the world. This investigation is concerned with the evolutionary relationships and distribution of those species occurring north of Mexico. Of the 17 species involved, most occur only in the southern United States, but several occur over wide areas in the temperate and colder regions of North America. *Oxyopes salticus* and *O. scalaris* are found from coast to coast, and *O. scalaris* ranges from British Columbia and Labrador to northern Mexico. It is of interest that several widely distributed species of *Oxyopes* are also found in the temperate regions of Europe and Asia.

Large collections from Central America, Mexico and the West Indies were examined to determine the range of the oxyopids found north of Mexico. This study also illuminated the relationship between the Mexican, Central American and West Indian faunas and that of temperate North America. A preliminary examination of the species occurring in the Neotropical region reveals that the number of described species of Oxyopidae will almost certainly be doubled when the tropical regions have been fully investigated.

The oxyopid types of O. Pickard-Cambridge and F. O. Pickard-Cambridge (1894, 1902), deposited in the British Museum (Natural History), were examined as a part of this study. Their examination provided the information that determined whether or not the names used by O. P.- and F. O. P.-Cambridge should be applied to any of the oxyopids found north of Mexico.

C. A. Walckenaer (1838, 1841) in his "Histoire Naturelle des Insects" described six species of Oxyopidae from the Georgia region of the United States. These descriptions were based on the drawings in the unique manuscript of John Abbot (1792). The drawings are expertly done and adequate for identification of some species. However, it is often difficult or impossible to decide on the basis of color pattern what species is figured, and only if the specimen were at hand, or the genitalia figured, could one make an accurate decision. Walckenaer had few specimens to guide him and frequently placed spiders in the wrong family, e.g. *Sphasus vittatus* Walckenaer is obviously a clubionid, not an oxyopid. The Abbot manuscript, also deposited in the British

² Based on latest records in the Zoological Record, vol. 98, sect. 12, 1961.

Museum (Natural History), was examined and the drawings photographed. These colored photographs are deposited in the Museum of Comparative Zoology. The names pertaining to the Oxyopidae that Walekenaer applied to the drawings of Abbot and Bose (1800) are discussed below.

GENERA OF OXYOPIDAE

Eleven genera are placed in the Oxyopidae at present. The number of species and the geographical distribution of species are listed in Table I. This list, based on that of Roewer (1954), includes the species described through 1961. Of the eleven genera listed, I have examined representatives of five (*Oxyopes*, *Hamataliwa*, *Peucetia*, *Oxyopeidon*, and *Tapinillus*) in collections from the entire world, with particular attention to those species occurring in North America, Mexico, Central America and the West Indies. From this study I conclude that *Oxyopeidon* must be synonymized with *Hamataliwa*, as Bryant (1948) has already pointed out. The genus *Oxyopeidon* was differentiated from *Hamataliwa* by the position of the anterior median eyes (AME) and by the spacing of the posterior median eyes (PME). Not only do such differences occur between closely related species, but these differences in eye arrangement may occur between sexes of the same species. The genus *Hamataliwa* is, therefore, redefined. From the descriptions in the literature it is apparent that the genus *Laestrygones* Urquhart is not an oxyopid and should be removed from the Oxyopidae, as has been done by Bryant (1933) and Forster (1955).

The descriptions of *Hostus paroculus* Simon and *Pseudohostus squamosus* Rainbow, the type species of monotypic genera, place them well within the range of variation found among species of *Oxyopes*. Simon (1898) places *Meguilla truncata* Thorell, another type species, in the genus *Hamataliwa* where it probably belongs. Remaining in the family Oxyopidae, then, are six valid genera: *Oxyopes*, *Peucetia*, *Hamataliwa*, *Tapinillus*, *Schaeniosceles*, and *Tapponia*. *Laestrygones* should be removed from the Oxyopidae. *Oxyopeidon* most certainly and *Meguilla* probably should be synonymized with *Hamataliwa*. The monotypic genera *Hostus* and *Pseudohostus* are probably synonyms of *Oxyopes*.

The structure of the genitalia, particularly of the male palpus, serves as an accurate indicator of generic as well as specific relationships. The above conclusions regarding the placement of

genera were based on characters of the genitalia together with general body form and color, and the relative length of the legs. The arrangement of the eyes and the width of the various eye rows prove useful in separating some genera (Tables II and III), but they were not used as the primary basis for establishing genera, as in the past. The examination of oxyopids from all parts of the world has indicated that the genus *Hamataliwa*,

TABLE I
GENERA OF OXYOPIDAE

| <u>Genus</u> <u>(Type-Species)</u> | <u>Author</u> | <u>Geographical</u> <u>Distribution</u> | <u>Number</u> <u>of Species</u> |
|--------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <u>Hamataliwa</u> <u>(grisea)</u> | Keyserling, 1887 | Neotropical | 14 |
| <u>Hostus</u> <u>(paroculus)</u> | Simon, 1898 | Madagascar | 1 |
| <u>Laestrygones</u> <u>(albiceres)</u> | Urquhart, 1894 | New Zealand and Subantarctic Isls. | 3 |
| <u>Meguilla</u> <u>(truncata)</u> | Thorell, 1897 | Indochina | 1 |
| <u>Oxyopeidon</u> <u>(putum)</u> | O. P.-Cambridge, 1894 | Ethiopian Neotropical | 5 24 |
| <u>Oxyopes</u> <u>(heterophthalmus)</u> | Latreille, 1804 | Palaeartic Ethiopian Oriental Malay Peninsula to New Guinea Australian Neotropical Nearctic | 19 93 45 1 23 47 11 |
| <u>Peucetia</u> <u>(viridis)</u> | Thorell, 1869 | Palaeartic Ethiopian Oriental Australian Neotropical Neotropical and Nearctic | 5 25 4 2 22 1 |
| <u>Pseudohostus</u> <u>(squamosus)</u> | Rainbow, 1915 | Australian | 1 |
| <u>Schaenioscelis</u> <u>(elegans)</u> | Simon, 1898 | Neotropical | 7 |
| <u>Tapinillus</u> <u>(longipes)</u> | Simon, 1898 | Neotropical | 4 |
| <u>Tapponia</u> <u>(micans)</u> | Simon, 1885 | Malay Peninsula and East Indies | 13 |
| | | Total | 371 |

Based on Roewer (1954) with additions from the Zoological Record through vol. 98, sect. 12, 1961.

when properly diagnosed, will undoubtedly prove to have a distribution comparable to that of *Oxyopes* and *Peucetia*. It is also possible that the large genus *Oxyopes* may be found to consist of several distinct groups each deserving generic status.

SUPERFAMILY LYCOSOIDEA

The oxyopids are grouped with the Agelenidae, Lycosidae, Pisauridae and Senoculidae in the superfamily Lycosoidea by most araneologists. The Oxyopidae, in common with most members of these families, possess: eight eyes, three tarsal claws without claw tufts, three pairs of spinnerets, two lung books opening at the corners of the epigastric furrow, a single tracheal opening in front of the anterior spinnerets, and a rather large colulus. In addition, all members of this superfamily, with the exception of the Agelenidae, have the trochanters notched. The trochanters of pisaurids and lycosids are more deeply notched than in oxyopids, while most agelenids do not have notches, although some do, according to V. D. Roth (per. comm.).

The lynx spiders are a highly specialized group of the Lycosoidea; that is, they are probably more unlike the ancestral stock than any other family in this complex. The agelenids, lycosids and pisaurids are linked by intermediate forms, whereas it is difficult to find intermediates between the oxyopids and any of these three families. I am not familiar with the spiders of the family Senoculidae except by examination of preserved specimens. They also appear to be a very distinct group of the Lycosoidea, but some authors place them near the Oxyopidae (Simon, 1898). On the basis of morphological characters and reported habits, I can see no close affinities between the Oxyopidae and Senoculidae. Although the oxyopids form a distinct line of evolution, their affinities unmistakably lie with the lycosoids.

Unlike most other representatives of the families of the Lycosoidea, the Oxyopidae are most active during the day. Many species are found running swiftly or jumping with great agility among low shrubs and herbs. The North American oxyopids are easily recognized in the field by the presence of numerous large erect spines on the legs (Figs. 4, 49, 50, 121, 138) and by their quick darting movements and sudden leaps. The posterior legs are well developed, concomitant with their jumping ability. The habits of these spiders and their relatively keen eyesight have earned for them the name *lynx* spiders.

Under the microscope one can readily identify the lynx spiders

by their peculiar hexagonal eye arrangement (Figs. 1-3, 108-111, 136, 137). The eye arrangement and the spines on the legs most readily separate the oxyopids from all other families of spiders. In addition, the lynx spider fixes its egg case to a twig or leaf and enmeshes it with a network of silk, or suspends it from a small limb or branch with a guy-line. The female always stands guard over the egg case until the young emerge. The nearest counterpart to this type of maternal behavior is found in some pisaurids that construct a so-called nursery web and remain near the egg case until the young spiderlings appear. In addition to this behavioral similarity, some tropical pisaurids, such as *Thanatidius*, with long thin legs and many spines, resemble *Peucctia* and *Tapinillus* in general structure. *Thanatidius* also inhabits tall grass and herbaceous vegetation as do many of the oxyopids. For these reasons I think that the nearest living relatives of the lynx spiders are among the Pisauridae.

BIOLOGY OF THE OXYOPIDAE

The Oxyopidae are diurnal hunting spiders. Most of the lynx spiders move actively about in search of prey. However, they often pause and assume a characteristic prey-catching posture to await their victim. *Hamataliwa* lies very still waiting in ambush for its prey, as do many crab spiders. The great majority of oxyopids live in tall grass, low shrubs and herbaceous vegetation. A few (*Hamataliwa*) are evidently arboreal in habits and some appear to run over the bare ground.

That relatively little is known concerning the biology of the Oxyopidae is due chiefly to the difficulty of observing these spiders in the field. Probably 95 per cent of the oxyopids collected are taken by sweeping; thus they are observed only when they appear in the sweep-net. Judging from their local abundance, the lynx spiders are among the major predators of insects occurring in low shrubs and herbaceous vegetation. Very few observations have been made on the feeding habits of the lynx spiders. Recent investigations by W. H. Whitcomb and associates (1963) have disclosed that the lynx spiders are important predators of crop-damaging insects. *Oxyopes salticus*, one of the most common spiders of the cotton fields in Arkansas, has been reported as the chief predator of the cotton boll worm. *Peucctia viridans* is also an important predator on insect pests of cotton fields. Although several species of *Oxyopes* have been recovered from the nest of the mud-dauber, *Sceliphron coementarium*, these

oxyopids do not constitute a large part of the prey of this wasp.

Among thousands of specimens of oxyopids examined during this investigation only very rarely was an egg case found. In several hundred vials containing *Oxyopes salticus*, only two egg cases were discovered. These were roughly spherical and about 3.5 mm in diameter; one contained 55 spiderlings and the other 18-20 eggs, each a little less than 1 mm in diameter. The extreme rarity of oxyopid egg cases is probably due to the method of collecting these spiders. In sweeping the vegetation the spiders are dislodged, but the egg cases, firmly attached to the vegetation, are not. Egg cases of *Peucetia viridans*, a much larger and more conspicuous lynx spider than *Oxyopes salticus*, are encountered more frequently. These egg sacs are rounded, from 12-25 mm in diameter, flattened on one side, and, except in the Southwest, have pointed projections on the surface. The eggs are about 1.5 mm in diameter. The number of eggs in an egg case is dependent on many factors and for that reason is extremely variable. The contents of nine egg cases of *Peucetia viridans* ranged from 197 to 602 eggs. Often the chief factor in determining the number of eggs deposited is probably the size of the individual spider, larger spiders depositing more eggs than smaller ones of the same species. *Peucetia viridans*, the largest North American lynx spider, produces many more eggs than the much smaller species of *Oxyopes*.

The North American lynx spiders evidently have one generation per year and probably construct only one egg case. The adults of several species of *Oxyopes* appear first in late spring (May and early June) and are most abundant in July and August. Adult *Peucetia* appear later, in late July and August, and are most abundant in August and September. In general there seems to be a correlation between the size of the species and its date of maturity. Smaller species of *Oxyopes* appear as adults in May, while *Peucetia* reaches maturity in July. From the limited information and observations made, it appears that most lynx spiders over-winter in the egg case as embryos or first instar spiderlings; however, in the extreme southern portions of their ranges there are probably several generations per year and adults may be found at any season.

Although very few observations have been made of oxyopids ballooning, they undoubtedly employ this means of dispersal. Glick (1939), in his study of the distribution of insects, spiders and mites in the air, reported 21 specimens of *Oxyopes* and one

Peucetia taken from 200-3,000 feet (70-1000 m), most nearer the lower elevation. These 22 specimens were collected from August, 1926 to October, 1931, in the air over Tallulah, Louisiana.

Suzuki (1952) reported that the chromosomes of five species of *Oxyopes* had been studied. All five species had 11 chromosomes in the haploid state and an XO sex-determining mechanism. The XO-mechanism of the male ($2N = 21$), as well as the number of chromosomes, was similar to that found in the subfamily Misumeninae of the family Thomisidae. In one species of *Peucetia* studied by Suzuki there were 13 autosomes and 2 X-chromosomes of different size. The male of *Peucetia* ($2N = 28$) was similar in these characters to many *Philodromus* species, as well as to most species of Lycosidae that were studied.

Since the oxyopids are diurnal and possess relatively keen sight, their courtship behavior probably plays an important role as a primary isolating mechanism. Mating in the Oxyopidae, however, has been observed only rarely, and the comparative aspects of this behavior are unknown. Gerhardt (1928, 1933) has observed courtship behavior in two European lynx spiders, *Oxyopes ramosus* and *Oxyopes heterophthalmus*. Although males of *O. heterophthalmus* readily displayed, Gerhardt (1933) succeeded in mating these spiders in captivity only once. Copulation is in the modified running-spider position (see Kaston, 1948, fig. 2006). The male approaches the female from in front and climbs on top. The venter of the female is slightly turned toward one side, allowing insertion of the palpus. In *O. heterophthalmus* the large tibial process (Fig. 101) of the male is used to orient the palpus. The male swings itself around 180° so that its body is in the same direction as the female's. No observations of the mating behavior of North American oxyopids have been recorded. A comparison of courtship behavior in the lynx spiders would, undoubtedly, prove most informative.

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many species. Dr. Gertsch was kind enough to include specimens that he had previously recognized as new species and they are described in this study with his permission.

During the course of this investigation I spent several weeks at the British Museum (Natural History) where I examined the types of O. P.- and F. O. P.-Cambridge. Photographs were also made of the plates of John Abbot (1792) which are deposited in the library of that museum. I am grateful to Dr. G. Owen Evans, Mr. Douglas Clark and Mr. Keith Hyatt for making my visit to the British Museum (Natural History) a most pleasant and profitable one. Professor M. Vachon supplied photographs of the Bose plates, which are kept in the library of the Muséum National d'Histoire Naturelle, Paris.

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WALCKENAERIAN NAMES

Walckenaer (1838) in Volume I of "Histoire Naturelle des Insectes Aptères," named and described, from the Georgia region of North America, three new species of oxyopids in the genus *Sphasus*, a genus since synonymized with *Oxyopes*. In addition,

Walckenaer (1838, 1841) named and described three species of *Clastes*, placed in the family Sparassidae, from the Georgia region. The six names that concern us in this paper were applied to the original drawings of the unique manuscript of John Abbot (1792). Since they were rediscovered in the British Museum (Natural History) by McCook (1888), the Abbot drawings have been considered the types of the Walckenaerian names by most North American araneologists. They had been used with some reservation, however, until Chamberlin and Ivie (1944) attempted "to determine, as far as possible from available evidence, the proper application of the names based by Walckenaer upon Abbot's drawings of the spiders of Georgia." In their paper, Chamberlin and Ivie placed in synonymy many well-established names that had been used for North American spiders. Involved are 282 names that Walckenaer applied to drawings made by Abbot. These must be considered when revising almost any family of North American spiders. I agree with Levi and Levi (1961) that these names can only be given proper treatment by the investigator who has made a thorough and intensive taxonomic study of the spider genera in question. Unfortunately, Walckenaer made many mistakes in the identification of the Abbot drawings, and Chamberlin and Ivie have made some errors in their all-inclusive determinations of the Abbot drawings. A few of these errors are pointed out by Levi and Levi (1961) and this investigation has disclosed several more.

Of the three species of *Sphasus* (= *Oxyopes*) described by Walckenaer, only one appears to be an oxyopid. The disposition of the three is as follows:

Sphasus arcuatus Walckenaer (Abbot numbers 322, 323) is not an *Oxyopes*, as it was designated by Chamberlin and Ivie (1944), but probably belongs in the theridiid genus *Spintharus*. There are no spines on the legs of this spider as figured by Abbot, an important characteristic of all oxyopids; the color pattern is not like that of any oxyopid that I have seen, but is similar to that of *Spintharus flavidus* (Hentz); and the eye arrangement, a very important character, is not as in the Oxyopidae. Body form, coloration, and relative length of the legs is like that in *Spintharus flavidus* (Hentz).

Sphasus vittatus Walckenaer (Abbot number 369) is obviously not an oxyopid. This spider was placed in the genus *Castianeira* of the family Clubionidae by Chamberlin and Ivie

(1944). Judging from the original figure of Abbot, that is where it probably belongs. However, no species is known to which the description and figure can be applied.

Sphasus lanceolatus Walckenaer (Abbot number 42) is an oxyopid. Chamberlin and Ivie (1944) described a species of *Oxyopes* under this name. Although they designated a neotype, it has no validity since the holotype, namely Abbot's figure 42, is still extant. The neotype has since been misplaced or lost and was not available for examination; thus it cannot be compared with Abbot's original figure. We have only the figure of Abbot to guide us, and the dorsal view, showing the color pattern and eye arrangement, is not sufficient for diagnosis in this case. The colored drawing of Abbot, much like that of *Oxyopes scalaris* Hentz, may also be *O. aglossus* Chamberlin or *O. acleistus* Chamberlin. Chamberlin and Ivie (1944), however, considered these three species distinct from *O. lanceolatus*. *Oxyopes lanceolatus* has been perpetuated in the catalogues of Marx (1890), Petrunkevitch (1911), Roewer (1954), and Bonnet (1958). It has not otherwise been used in the literature except by Chamberlin and Ivie (1944). Since the name *O. lanceolatus* might be applied to at least four distinct species, I think that it is best considered a *nomen dubium*.

Three names proposed by Walckenaer (1838, 1841), *Clastes abboti* (Abbot number 401), *C. roseus* (Abbot number 411), and *C. viridis* (Abbot number 406), were recognized as the same species by Chamberlin and Ivie (1944). They applied the name *Peucetia abboti* (Walckenaer) to this large green lynx spider of the southeastern United States. The name *Peucetia viridans* (Hentz) had been used for this species for 100 years prior to the change by Chamberlin and Ivie (1944). Hentz's name actually has priority, having been used first in 1832, six years before Walckenaer's publication.

Walckenaer previously (1805) described and named another oxyopid for a drawing appearing in the unique manuscript of Bose (1800) on the spiders of the Carolinas. This manuscript is deposited in the Paris Museum. The drawing (Bose, pl. 4, fig. 1) was designated *Aranea fossana* by Bose (1800), and its description was published by Walckenaer (1805) who called it *Sphasus fossanus*. Judging by Bose's drawing and the description of Walckenaer, this species is *Peucetia viridans* (Hentz). *Oxyopa fossana* was listed by Simon (1864) and the name *Oxyopes fossanus* has been perpetuated in the catalogues

of Marx (1890), Petrunkevitch (1911), Roewer (1954) and Bonnet (1958). The name has never been applied or used in any manner to designate a species of *Oxyopidae*. It is here considered a *nomen oblitum*.

In summary, the following dispositions have been made of the Walckenaerian names: *Sphasus arcuatus* is probably *Spintharus flavidus* Hentz; *Sphasus vittatus* is probably a *Castianira*; *Sphasus lanecolatus* is a species of *Oxyopes*, but there is some doubt as to which one; *Clastes abboti*, *C. roseus*, and *C. viridis* are *Peucetia viridans* (Hentz). *Sphasus fossanus* is probably *Peucetia viridans* (Hentz), and is considered a *nomen oblitum*.

METHODS

Measurements. Two sets of oculars with accompanying grids were used in combination with low and high power objectives for making measurements. The higher power combination was used in measuring the width of the eye rows and was determined to be accurate to 0.0125 mm or one-tenth unit of the micrometer grid. The lower power combination was used to measure the body dimensions and leg lengths and was determined to be accurate to 0.1 mm or one-tenth unit of the micrometer grid. A measurement when retaken was nearly always read within one unit of the original measurement with either of the above micrometer grids, e.g. an original measurement of 7.5 micrometer units when retaken yielded 7.4-7.6 units. In all cases the greatest dimension of the structure was recorded, e.g. patella-tibia length was measured as the greatest distance from a line tangent to the most proximal part of the patella to a line tangent to the most distal part of the tibia. All available specimens of sparsely collected species were measured and a set of 30 specimens of each sex was measured for those species abundantly represented in collections.

A series of 15 measurements involving various components of the spider was made for each specimen. The range and mean of the total length for each species is given in its description and the relative length of the legs is also given. Other diagnostic measurements are recorded for *Oxyopes* in Table II and for *Hamataliwa* and *Peucetia* in Table III. The segments of leg I were measured from the prolateral aspect, as was patella-tibia II. The patellae-tibiae of legs III and IV were measured from their retrolateral aspect.

Figures and color descriptions. The color descriptions and illustrations are based on fresh alcoholic specimens in most cases and represent these species as they appear in nature. The genus *Peucetia* is an exception. This spider is bright green in life, but the color washes out rapidly in alcohol. Therefore, an attempt was made to describe both preserved and living animals of *Peucetia*.

Color descriptions and illustrations were made under low power (15X) of a dissecting microscope, with the spider illuminated by a microscope lamp. The well-marked specimens are those in which the hairs forming the color pattern have not been rubbed off. Where variation is great, the color pattern or patterns representative of the greatest number of specimens is described, with significant differences noted. Well-preserved alcoholic specimens of *Oxyopes* and *Hamataliwa* are very similar in coloration to the living spider. The most frequent differences are caused by shrinking in alcohol, which disrupts the pattern on the abdomen, and rubbing off of the spatulate appressed hairs that make up much of the color pattern in these two genera.

For each species the face view as well as the dorsal view of a male and female (when available) was drawn, with additional drawings to indicate variation. At least two drawings of the female genitalia were made for each species: a ventral external view of the epigynum after all the hair had been removed (often revealing some internal structure through the integument), and a dorsal internal view with the separated genitalia submerged in clove oil for clearing. The female genitalia of all species of *Oxyopes* and *Hamataliwa* are drawn to the same scale. *Peucetia* is drawn on a smaller scale. The scales are indicated on the plates. Two views of the male palpi were drawn for each species: a ventral view and a retrolateral view. The left palpi of the males were drawn after gently scraping them free of hair to reveal the palpal sclerites and the tibial and patellar apophyses. No attempt was made to indicate hirsuteness or spination in these drawings. All palpi of *Oxyopes* and *Hamataliwa* are drawn to the same scale. *Peucetia* palpi are drawn on a smaller scale.

That area referred to as the *face* is, in oxyopids, the anterior vertical plane of the head as seen from in front (Figs. 1 and 5). It comprises the frontal aspect of the carapace and includes the front of the chelicerae.

Records. Complete records for all the specimens examined during this investigation are listed in the Doctoral Dissertation. Copies of the dissertation are deposited in the library of the Biological Laboratories and in Widener Library, Harvard University. Locality records are listed geographically by states in a sequence from north to south and from east to west. Counties are listed alphabetically under states, cities and towns alphabetically under counties. Counties only are listed when a particular species is abundantly represented and obviously common in a given geographic area. For less well collected species full information is provided. The number of specimens collected at each locality is indicated, with the lower case "o" representing immature specimens in the same manner that the ♂ and ♀ signs represent the mature sexes. Collectors' initials, following the localities, are listed in a separate index at the rear of this paper. Occasional collectors are given by name.

TAXONOMIC SECTION

FAMILY OXYOPIDAE Thorell

Oxyopidae Thorell, 1870, Nova Acta, Reg. Soc. Sci. Uppsala, Stockholm, 7(3):188, 196. Type-genus *Oxyopes*³ Latreille, 1804.

Characteristics. Eyes: Anterior row recurved, except in some *Hamataliwa*. Anterior median eyes (AME) smallest, much smaller than the anterior lateral eyes (ALE). Posterior row procurved (except in *Tapinillus*). Posterior median eyes (PME) equal in size to posterior lateral eyes (PLE); both pairs larger than the AME, but smaller than the ALE, which are the largest (Figs. 1-3, 108-111, 136, 137). The AME row is much the smallest in width, the ALE row is always larger than the AME row, and subequal to the PME row, except in *Peucectia*, *Tapinillus*, and some *Hamataliwa* (compare Table II with Table III). The PLE row is the widest.

The chelicerae are very long and tapering at the distal end, and the fangs are short. The base of the fang occupies most of the distal end of the chelicera. The cheliceral margins are short and armed with one tooth on each side of the anterior and posterior margins (*Oxyopes* and *Hamataliwa*) or without teeth (*Peucectia* and *Tapinillus*). The boss on the anterior lateral

³ According to Thorell (1869) *Oxyopes* is derived from the Greek and means sharp-eyed.

face of the chelicera is not so prominent as in agelenids, pisanirids and lycosids. The articular sockets of the chelicerae at the lower margins of the face are heavily sclerotized and darkly pigmented.

The cephalothorax is variable in shape. The drawings of *Oxyopes* (Figs. 2, 3, 6), *Peucectia* (Figs. 137, 142) and *Hamataliwa* (Figs. 109, 111, 114) indicate the form of the carapace from above. *Oxyopes* has the carapace high and convex, sloping sharply at the thoracic declivity and at the sides. The face is almost vertical. *Hamataliwa* has the carapace even higher in many species, more sharply vertical at the thoracic declivity and sides, but with the face sometimes sloping more gradually and not vertical, as illustrated in Figures 109 and 111. *Peucectia* has the carapace more flattened, not as convex as in *Oxyopes*, and tapering gradually to the sides. This genus is more lycosid in appearance than the others. The thoracic groove is prominent in *Peucectia*, and not deep, but also usually well marked in *Oxyopes* and *Hamataliwa*.

The labium is always longer than wide and the endites exceed greatly its length and converge in front of it (Figs. 10 and 139). The sternum is roughly heart-shaped or shield-shaped (Figs. 10 and 139), and tapers behind to a thin projection between the posterior coxae.

The abdomen is elongate, widest immediately behind the base and more or less sharply tapering behind. In *Oxyopes* it is ovoid or elliptical and tapers sharply behind; in *Hamataliwa*, truncate near the base and again tapering to a point; but in *Peucectia* the abdomen is somewhat cylindrical, more elongate than in the two preceding genera, and tapering more gradually to the spinnerets.

The abdomen is connected to the cephalothorax by a short pedicel, often visible from above. The superior lorum, usually visible from above, is composed of a single undivided sclerite. It is divided into two sclerites in the Lycosidae and Pisauridae.

The six spinnerets are terminal. The cylindrical anterior spinnerets consist of a relatively large basal segment and an abbreviated, almost ring-like, apical segment. The posterior spinnerets, also two-segmented, are about the same length as the anterior, but more slender in diameter, with the apical segment shorter than the basal one, but larger than the distal segment of the anterior spinnerets. The tiny middle spinnerets are well hidden in their position between and slightly forward of the

posterior ones. The second segment of the posterior spinnerets is tapered on its inner surface where it is supplied with a number of rather large spigots (tiny finger-like projections that house the openings of the silk glands). A short obtuse eolulus is present immediately in front of the anterior spinnerets. The anal tubercle is prominent, roughly triangular in shape, and subsegmented.

The long legs are of unequal length (Figs. 4, 49, 50, 121, 138). The relative length of the legs is useful in separating genera and species groups. The order of leg length may be I-II-IV-III, I-II=IV-III, I-II-III-IV or IV-I-II-III. The males have more elongate tarsi and metatarsi than the females and longer legs in relation to their body length (Tables II and III). The legs are armed with very long spines, one of the most conspicuous characteristics of the family (Figs. 4, 49, 50, 121, 138). The trochanters have a shallow, crescent-shaped depression on the ventral surface.

There are three tarsal claws, the superior pair largest and provided with many fine teeth, the single inferior claw very small, with two or three fine teeth.

The integument of most oxyopids is copiously supplied with flattened, appressed hairs of varying colors, but usually elliptical or spatulate in shape. There are also modified translucent, flattened hairs, very scale-like in appearance, that give off brilliant metallic hues of lavender, green and blue. The spatulate hairs often cover much of the body and create the characteristic color patterns of the species (particularly in the genus *Oxyopes*).

The structure of the genitalia has a definite pattern within each genus. The palpi and epigyna are of prime importance in determining generic as well as specific affinities. The different structural patterns are discussed under each genus.

KEY TO GENERA

- 1a. Posterior cheliceral margin without teeth; ALE row obviously wider than PME row; posterior eye row (PME and PLE) only slightly procurved (Figs. 137, 142). Living specimens of bright green color *Peucetia*
- 1b. Posterior cheliceral margin with a single tooth on each side; ALE row subequal to PME row (Figs. 2, 3) or PME much wider than ALE (Figs. 109, 111); posterior eye row (PME and PLE) strongly procurved (Figs. 2, 3, or Figs. 109, 111). Living specimens not green in color 2

- 2a. Distance between PME subequal to distance between PME and PLE on each side (Figs. 2, 3) 3
- 2b. Distance between PME much greater than distance from PME to PLE on each side (Figs. 109, 111) *Hamataliwa* (except *H. helia*)
- 3a. Leg IV robust, obviously longer than leg III. Order of leg length I-II-IV-III, I-II = IV-III or IV-I-II-III. *Oxyopes*
- 3b. Leg IV small, subequal in size to leg III. Order of leg length I-II-III-IV *Hamataliwa helia*

OXYOPES Latreille

Oxyopes Latreille, 1804, Tableau methodique des Insectes, Nouveau Diet. Hist. Nat., Arachnides, 24:135. Type species by monotypy: *O. heterophthalmus* Latreille, 1804, *op. cit.*, 24:135.

Characteristics. Eyes: AME smallest; PME and PLE subequal in size, larger than AME, but slightly smaller than ALE. ALE largest.

Width of eye rows: AME row much the smallest; ALE row subequal to the PME row. PLE row much the widest (Table II).

Cephalothorax high and convex, the cephalic region sometimes slightly elevated, sloping sharply at the thoracic declivity and along the sides. The face is almost vertical.

Labium longer than wide (Fig. 10). Endites exceeding the length of labium and converging in front of it.

Abdomen elongate, widest immediately behind base and tapering to spinnerets.

Legs very long in comparison to body length and unequal in relative length (Table II). Legs with numerous stout spines. Order of leg length I-II-IV-III or I-II=IV-III (*acleistus* group, *O. salticus*, *O. scalaris*) and IV-I-II-III (*apollo* group). Patellae-tibiae longer than femora or metatarsi, except on leg IV in some cases, thereby serving as a good indicator of leg length.

Integument richly supplied with flattened spatulate-shaped hairs that provide contrasting color patterns over most of body.

In the ventral view of the left palpus of the male the *embolus* curves from the base along the mesal edge of the *cymbium*, and describes a clockwise arc. The distal end of the embolus rests on a well-developed *conductor* (at approximately one o'clock), characteristic in size and shape for each species. At the point where the embolus arises, there is usually a structure which I call the *lamellar apophysis*, also of characteristic form and size for each species (Fig. 36).

Females with the epigyna variable, but with the internal genitalia of rather simple structure and generally uniform

throughout the genus. External openings of the epigynum leading to a pair of heavily sclerotized bulb-shaped *seminal receptacles*. From the dorsal side of the seminal receptacles, a pair of lightly sclerotized, almost invisible, fertilization ducts arise and continue ventrally around the posterior neck of these bulbs (Fig. 15).

SPECIES GROUPS OF OXYOPES

The genus *Oxyopes* in North America may be separated into several distinct species groups: the *acleistus* group containing four species, the *apollo* group containing six species, and two independent species, *O. salticus* and *O. scalaris*. The establishment of these groups is based on similarities in genitalia, body structure, color pattern, and the relative length of legs.

Acleistus group. In the *acleistus* group (*O. acleistus*, *O. aurcus*, *O. aglossus*, *O. occidentis*), the females have a broad, heavily sclerotized bar forming the epigynum and covering the openings of the seminal receptacles (Figs. 16, 20, 22, 24) or a less heavily sclerotized epigynum with an inverse T-shaped central opening as in Figures 14 and 19. The palpi of the males have well-developed retrolateral tibial apophyses (Figs. 34, 36, 38, 40). *Oxyopes acleistus*, *O. aurcus* and *O. aglossus* have distinct black lines on the ventral surfaces of femora I, II and III. *Oxyopes occidentis* is the most divergent member of this group. It does not have these black lines under the femora, but has the same general color pattern. The epigynum as well as the male palpus and relative length of the legs of *O. occidentis* ally it to the *acleistus* group.

The lynx spiders of the *acleistus* group all have the first leg longest and well developed. The second leg is usually next in length, although the fourth leg may be almost as long and is always more robust than the second leg. The patellae-tibiae are always I-II-IV-III in order of length (Table II). Femora IV are always strongly developed and the metatarsi exceed the length of the patellae-tibiae on leg IV.

A comparison of the species in this group is provided in Diagram 3 and a comparison of the *acleistus* group to other species of *Oxyopes* is provided by Table II. *Oxyopes acleistus* and *O. aureus* are the two species most alike in the group. They are very similar in the form of genitalia and in coloration and are entirely allopatric in distribution. *Oxyopes acleistus*, however, appears to be consistently smaller than *O. aureus*. Other

differences between these two species are noted under the diagnosis of *O. acleistus*. *Oxyopes aglossus* is partially sympatric with *O. aureus* (Map 1) and is definitely smaller in size (Table 11). *Oxyopes aglossus* and *O. acleistus* are closer in size than *O. aureus* and *O. acleistus* and may exclude one another from their ranges (Map 1). Observing the distribution of these species, we may theorize that *O. aglossus* has provided a barrier to gene flow between *O. aureus* and *O. acleistus* and effectively isolated these two species.

The following hypothesis of historical events might explain the present distributions of these three species. *Oxyopes aureus* and *O. acleistus* were once a continuous interbreeding population, distributed from Mexico along the Gulf Coast into Florida, and this hypothetic species reached as far north as Kansas, Missouri, Illinois and Indiana. This was during an interglacial period of a more warm and favorable climate. *Oxyopes aglossus* at this time was even more northerly in distribution, reaching southern Canada. It was excluded from the range of *O. aureus-acleistus*, the postulated species, because of its similar ecological requirements. Later in their history these three incipient species were forced to retreat southward. For our purposes we may think of their retreat as coinciding with the advance of the ice cap during the Pleistocene. *Oxyopes acleistus* retreated into peninsular Florida while *O. aureus* retreated to the southern tip of Texas and northern Mexico. The advancing glacier also forced *O. aglossus* southward and it occupied the regions along the Gulf Coast vacated by *O. aureus* and *O. acleistus*, forming an effective barrier to gene flow between these two species. In this case we have probable historical events explaining the present distribution of these three species.

The relationships of the four species of the *acleistus* group are summarized in the following diagram. This diagram is based primarily upon morphological characters, but also takes into account distribution.

The lines leading to *O. aglossus* and *O. occidens* could be drawn to the right of *O. acleistus* and *O. aureus* as well as to the left, indicating equal similarity to both of these species. *Oxyopes occidens* is somewhat closer to *O. aglossus* in genitalia, but resembles *O. aureus* more in size and coloration.

Apollo group. The *apollo* group constitutes another complex of species recognized by their color pattern, all having the fourth leg longest and the palpus of the males with a well-developed apophysis on the patella, with the one exception of *O. felinus*.

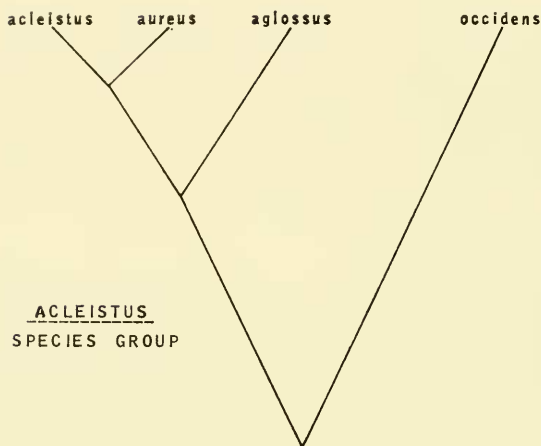


Diagram 1

In addition, the epigyna of the females that are known have a heavily sclerotized posterior rim in the shape of a crescent or bow as in Figures 47, 51, 53, 54. This species group consists of *O. apollo* and *O. floridanus*, two closely related species in the East, and *O. tridens*, *O. pardus*, *O. lynx*, and *O. felinus*, all found in the southwestern United States.

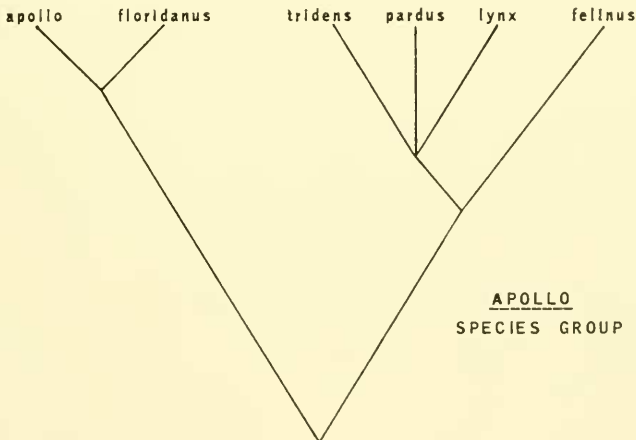
A comparison of the species in this group is provided in Diagram 4 and a comparison of the *apollo* group to other species of *Oxyopes* is supplied by Table II. Only three species were abundant enough in collections to construct Dice-Leraas graphs in Diagram 4. These graphs indicate that *O. apollo* and *O. floridanus* are morphologically very similar. These two species are separated primarily by differences in the male palpi and a greater abundance of spatulate hairs in *O. floridanus*. These slight differences are, however, indicative of reproductive isolation. The fact that *O. floridanus* is restricted to peninsular Florida serves to support its recognition as a separate species. Collections from intermediate geographic regions (Louisiana, Mississippi, Alabama, and western Florida) will help to determine if these two species, as I have called them, are reproductively isolated.

The western species of the *apollo* group, which we can define collectively as the *tridens* complex, are apparently all sympatric in a broad sense. They may be separated from one another altitudinally or by very restricted distributions within a geographic area, such as in mountain ranges (geographic isolation) or in

certain habitats (ecological isolation). *Oxyopes tridens* seems to have a relatively wide distribution, however, being found at various altitudes and over a relatively wide geographic area. The reason for the extreme rareness of the other three species of the *tridens* complex (*O. lynx*, *O. pardus*, and *O. felinus*) may be attributed to their habits. All of the species of the *apollo* group are apparently ground inhabitants, that is, they run or hop about over bare ground. In the Southwest, *Oxyopes tridens* and related species have been collected as they jumped about on dry hillsides strewn with boulders and smaller rocks, but with very little vegetation. These species have been rarely taken by sweeping vegetation, but they may occur on certain types of plants when these are present.

It is significant to note that W. H. Whitcomb (pers. com.), who has collected extremely large numbers of *Oxyopes sallicus* and a good number of specimens of *Oxyopes aglossus* by sweeping crop plants in Arkansas, has failed to collect even one specimen of *O. apollo* by this method. Instead, *O. apollo* is recovered rather frequently in pitfall traps laid flush with the ground.

The relationships of the six species that constitute the *apollo* species group are summarized in Diagram 2. This diagram is based primarily upon morphological similarities, but takes into account distribution as well. The male palpus of *O. felinus* does not have a patellar apophysis, but the color pattern, the structure of palpal sclerites and the long fourth leg places it near *O. tridens*, *O. pardus* and *O. lynx*. *Oxyopes apollo* and *O. floridanus* are obviously very similar to each other. *Oxyopes*



tridens, *O. lynx* and *O. pardus* could be placed in any sequence, being equally alike or distinct. When the females of the latter two species and *O. felinus* are known, their relationships will become more clear.

The remaining two species of *Oxyopes*, *O. scalaris* and *O. salticus*, are very different from the other species north of Mexico and in their proper context would constitute separate species groups. *Oxyopes scalaris*, as has been pointed out, is similar to *O. ramosus* and *O. heterophthalmus* of Europe. Since *O. scalaris* is found as far north as Labrador we might hypothesize that the progenitors of this species came from the Eurasian continent by way of the British Isles, Iceland, and Greenland, to Canada where they occur today. Again, this migration must have occurred when the climate in these areas was warmer and more favorable. There are no oxyopids known from Iceland or Greenland at the present time.

Oxyopes salticus bears some resemblance to the four species in the *acleistus* group and might be placed with them in a sub-generic grouping. Comparison of *O. salticus* and *O. scalaris* with other species of *Oxyopes* can be seen in Diagrams 5 and 6. In Diagram 6, *O. apollo* and *O. tridens* have patella-tibia IV much longer than I. This trend in the *apollo* group, for the fourth patella-tibia to be longest, is evident in the figures in Table II and is correlated with the great length of the fourth pair of legs.

KEY TO SPECIES OF *OXYOPES*

MALES

- | | | |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1a. | With distinct black lines on the ventral surfaces of femora I and II | 2 |
| 1b. | Without distinct black lines on the ventral surfaces of femora I and II | 5 |
| 2a. | With a well-developed retrolateral tibial apophysis (Figs. 35-40) and no tuft or brush of stiff hairs on the ventral surface of the patella of the palpus. Color pattern as in Figures 27-32 | 3 |
| 2b. | With the tibial apophysis concave, no well-developed retrolateral tibial apophysis, and with a tuft or brush of stiff hairs on the ventral surface of the patella of the palpus. Color pattern as in Figures 80-84. Palpus as in Figures 104, 105 | <i>salticus</i> |
| 3a. | With two teeth at the base of the retrolateral tibial apophysis of the palpus (Figs. 35, 37) | 4 |
| 3b. | With only a single tooth at the base of the retrolateral tibial apophysis of the palpus (Fig. 39) | <i>aglossus</i> |

- 4a. Palpus with a large lamellar apophysis and tibial apophysis forming a less acute angle at the distal end (Figs. 35, 36). Texas and Louisiana
..... *aureus*
- 4b. Palpus with a small lamellar apophysis and tibial apophysis forming a more acute angle at the distal end (Figs. 37, 38). Florida *acleistus*
- 5a. A conspicuous apophysis on the patella of the palpus and/or dorsal color pattern of longitudinal black and white stripes running the length of the body (Figs. 56-63). Leg IV longer than leg I 6
- 5b. Patella of palpus without apophysis and dorsal color pattern not black and white stripes running length of body. Leg I longer than leg IV 9
- 6a. Color pattern of longitudinal black and white stripes running length of body (Figs. 56-63) 7
- 6b. Color pattern not black and white stripes running length of body. Pattern as illustrated in Figures 72, 73 or 76, 77 8
- 7a. Palpus illustrated in Figures 70 and 71 *tridens*
- 7b. Palpus illustrated in Figures 68 and 69 *pardus*
- 7c. Palpus illustrated in Figures 66 and 67 *lynx*
- 7d. Palpus illustrated in Figures 64 and 65 *felinus*
- 8a. Palpus illustrated in Figures 74 and 75 *apollo*
- 8b. Palpus illustrated in Figures 78 and 79 *floridanus*
- 9a. Light yellow or golden in general appearance. Pattern illustrated in Figures 25 and 26. Palpus in Figures 33 and 34 *occidens*
- 9b. Russet brown, dark brown or gray in general appearance. Pattern illustrated in Figures 87 and 88. Palpus in Figures 106-107 *scalaris*

KEY TO SPECIES OF *OXYOPES*

FEMALES

- 1a. With distinct black lines on the ventral surfaces of femora I and II 2
- 1b. Without distinct black lines on the ventral surfaces of femora I and II 5
- 2a. Epigynum with an anteriorly directed scape (Figs. 91-96). Pattern illustrated in Figures 85 and 86 *salticus*
- 2b. Epigynum without an anteriorly directed scape; with a more or less well-developed posterior sclerotized rim or a heavily sclerotized transverse bar 3
- 3a. Epigynum consisting of a broad transverse bar (Fig. 22); pattern illustrated in Figures 9, 11, 12 *aglossus*
- 3b. Epigynum consisting of a sclerotized transverse posterior rim that has an anterior depression or with a less-heavily sclerotized transverse piece disclosing a central cavity (Figs. 14 and 16, 19 and 20) 4
- 4a. Central cavity of epigynum large, almost elliptical in shape (Fig. 19) or enclosed by a transverse sclerotized bar in which case the epigynum appears as in Figure 17 or 20. Florida *acleistus*
- 4b. Central cavity of epigynum narrow, inversely T-shaped (Fig. 14) or enclosed by a transverse sclerotized bar in which case the epigynum appears as in Figure 16 or 17. Louisiana and Texas *aureus*

- 5a. Leg IV longer than leg I 6
 5b. Leg I longer than leg IV 8
 6a. Color pattern of longitudinal black and white stripes extending length of body (Fig. 46); epigynum with strongly raised crescent-shaped posterior rim (Figs. 53 and 54) *tridens*
 6b. Color pattern not of longitudinal black and white stripes, but as in Figure 42 or 44; epigynum with posterior rim only slightly raised (Figs. 47 and 51) 7
 7a. Carapace, abdomen and legs heavily clothed with spatulate or elliptical-shaped, flattened white hairs. Florida *floridanus*
 7b. Carapace mostly glabrous with scattered white hairs along vertical sides. Tennessee, Missouri, Arkansas, Louisiana, and westward. *apollo*
 8a. Russet brown, dark brown or gray in general appearance with contrasting white markings (Fig. 90); epigynum with an anteriorly directed scape (Figs. 98 and 99) *scalaris*
 8b. Light yellow or golden in general appearance (Fig. 8); epigynum a transverse bar (Fig. 24) *occidens*

SPECIES DESCRIPTIONS

OXYOPES ACLEISTUS Chamberlin

Figures 5, 6, 18-20, 29, 30, 37, 38. Map 1.

Oxyopes acleistus Chamberlin, 1929, Ent. News, 40:19, fig. 3, ♀. Female holotype from Sanford, Seminole Co., Florida, in the American Museum of Natural History, examined. Roewer, 1954, Katalog der Araneae 2(a):330. Bonnet, 1958, Bibliographia Araneorum, 2(4):3223.

Oxyopes nelsoni Bryant, 1945, Psyche, 52(3-4):180, figs. 5, 7, ♂, ♀. Female holotype from Sebastian, Indian River Co., Florida, in the Museum of Comparative Zoology, examined. NEW SYNONYMY.

Discussion. The female described by Miss Bryant as *Oxyopes nelsoni* has a greater sclerotization of the epigynum, reducing the size of the central cavity that leads to the openings of the seminal receptacles (Fig. 20). The original description by R. V. Chamberlin was based on a specimen similar to Figure 19 in which the epigynum is less heavily sclerotized, and there is a characteristically shaped central cavity leading to the openings of the seminal receptacles. These two distinct forms of the epigynum are apparently characteristic of *O. acleistus*. Of the seven females of *O. acleistus* examined, two have the enclosed or "nelsoni" form of epigynum, three have the open or "acleistus" form of epigynum, and one is a bilateral combination similar to Figure 17. This dimorphism of the epigynum is found in the closely related species *O. aureus* in which both types occur in the same population as well as individuals that have one-half

of the epigynum enclosed and one-half open. The male allotype of *O. nelsoni* from Sebastian, Florida, is identical with males of *O. aelcistus*.

Structure. Length of seven females, 4.4-6.5 mm, mean 5.3 mm; length of nine males, 3.8-4.8 mm, mean 4.4 mm. Order of leg length I-II-IV-III. For comparison of certain diagnostic measurements of *O. aelcistus* with those of other species see Table II and Diagram 3.

Color. Female. Pattern illustrated in Figures 5 and 6. Eyes circled with black, eye region dark brown, but heavily clothed with white hair. Face pale yellow to ivory. Vertical brown stripes beginning broadly under ALE, narrowing considerably at lower edge of elypeus and continuing to distal region of chelicerae. Carapace pale yellow to ivory with darker brown markings at anterior end. Wide dark brown submarginal stripes originating under PLE and continuing to posterior declivity. Thoracic groove a thin brown line. Darker patterns and stripes on carapace formed by tiny spatulate hairs.

Dorsum of abdomen pale yellow or cream colored from base to tip of spinnerets, bordered by dark brown or black. Two pairs of white indentations directed diagonally forward. Cardiac area slightly darker. Venter of abdomen pale yellow or cream with faintly indicated broad median stripe of darker brown, this stripe bordered by thin whitish lines. One specimen has the median stripe quite dark and distinct.

Legs pale yellow to ivory with longitudinal median black stripe on ventral surface of femora I, II and III. The black stripe is obsolete on leg IV, but may be represented by a series of dashes. The leg segments distal to the femora tend to be slightly darker and in some cases gray hairs form irregular dusky markings, particularly on the distal half of the femora. There may also be a slight green metallic sheen from the legs, although not so distinct as in the male.

Endites cream or ivory colored with black scopulae at inner margins of distal region. Labium slightly darker. Sternum ivory.

In some cases the spatulate hairs of the carapace may be rubbed off and the darker submarginal stripes are only faintly represented. Several of the specimens appear much lighter than in Figure 6 because the pale central area covers more of the dorsum of the abdomen and the marginal areas are not so dark and contrasting. They appear much the same as *O. aurcus* in Figure 3.

Male. Pattern illustrated in Figures 29 and 30. Eyes circled in black with black bands extending from each eye toward center of eye hexagon. Face light brownish yellow or gold with vertical black lines extending from ALE to distal region of chelicerae, as in Figure 29, or with face mostly black, as in Figure 27. Eye region with iridescent scales particularly from ALE to PME. The palpi are velvety black, and in some specimens they exhibit a blue iridescence.

Carapace brownish yellow or golden with broad submarginal brown stripes as in female.

Dorsum of abdomen ranges from almost white to gray depending upon abundance of spatulate hairs. Sides of dorsum are gray to black. Dorsum with scattered iridescent scales. Venter of abdomen ranging from pale yellow with dusky median stripe to gray with a black median stripe outlined in yellow. Iridescent scales more numerous on venter than dorsum.

Legs yellow with black stripes on the ventral surfaces of femora I, II, and III. In most specimens the legs exhibit a green metallic sheen due to iridescent scales.

Endites pale yellow to brown with the distal ends lighter. Labium darker, brownish yellow to dark brown. Scopulae black. Sternum pale yellow or cream.

Diagnosis. *Oxyopes acleistus* is most similar to *O. aureus* in coloration and in the form of the male and female genitalia. A comparison of Figure 14 with Figure 19, however, reveals distinct differences between the central cavities of the epigyna. In the palpi the median apophysis of *O. acleistus* is smaller than in *O. aureus* (compare Fig. 38 with Fig. 36) and the tibial apophysis of *O. acleistus* forms a more acute angle toward its distal end than in *O. aureus* (compare Fig. 37 with Fig. 35).

Because *O. acleistus* and *O. aureus* are similar and occur as distinct allopatric populations, one might assume them to be subspecies (Map 1). However, in addition to the differences in genitalia already noted, a comparison of the diagnostic measurements in Table II and in Diagram 1 reveals that *O. aureus* is probably consistently larger than *O. acleistus*. All of these differences indicate that isolating mechanisms exist between the two, and that *O. acleistus* and *O. aureus* would not interbreed if they were to come into contact.

It is interesting that in many cases (Wallace, 1942a, 1942b; Brady, 1962; McCrone, 1963) the distribution of spider species

found in Florida is restricted to the peninsula or does not extend far beyond the limits of the state. Almost any large revision will reveal cases of this limited distribution.

Natural history. Males and females of this species were collected by sweeping short grass and herbaceous vegetation. During early June they did not occur in great abundance and only a few specimens were captured in approximately two hours of sweeping. *Oxyopes acleistus* seems to prefer low vegetation in shaded areas. A single male was found running over the outside wall of a tent at Gold Head Branch State Park and a female was taken from the top of a picnic table at the same location.

Distribution. Florida (Map 1).

Records. Florida. Dade Co.: ♂ (THH); Homestead ♀ ♀. Highlands Co.: Highlands Hammock St. Pk. near Sebring, 21 June 1962, ♂ ♂ ♀ ♀ (ARB, JAB). Indian River Co.: Sebastian, 1-8 Apr. 1944, ♂ ♂ ♀ (GN). Orange Co.: 10 mi. SW of Orlando, 23 Aug. 1944, ♂ (MN). Putnam Co.: Gold Head Branch St. Pk., 13 June 1962, ♀ (ARB), 14 June 1962, ♂ (C. Zeiger); Welaka, 21 June 1946, ♂ ♂ (R. E. Bellamy). Seminole Co.: Sanford, 27 July 1927, ♀ (Stone).

OXYOPES AUREUS sp. n.

Figures 1-4, 13-17, 27, 28, 35, 36. Map 1.

Holotype. Female from Bentsen State Park, 6 mi. SW of Mission, Hidalgo Co., Texas, 30 June 1962 (A. R. Brady) in the Museum of Comparative Zoology. The specific name is an adjective meaning golden.

Discussion. *Oxyopes aureus* is probably the most variable species of this genus in North America with regard to local populations. The female may appear dark with a distinct abdominal pattern (Fig. 1), or may appear much lighter (Fig. 3). In addition, the male may have the face lined with black (Fig. 29) or almost entirely black (Fig. 27). The female epigynum also shows considerable variation (Figs. 14-17). Of 30 females examined, 17 have the epigynum as in Figure 14, eight as in Figure 16, and five females have a bilaterally divided combination as in Figure 17. All three types of epigyna are encountered in the same local population.

Since there are two rather distinct epigyna (Figs. 14, 16) and two relatively distinct color patterns (Figs. 1, 3), it was

thought that two species might be present. The correlation between color pattern and the type of epigynum was closely checked. Although many specimens with a color pattern as in Figure 1 had an epigynum as in Figure 16, and many specimens with a color pattern as in Figure 3 had an epigynum as in Figure 14, these combinations were not found in a number of individuals. Also the color patterns formed a continuum and in some cases were difficult to classify.

The size of the female specimens was also checked carefully with respect to the possession of a particular color pattern and/or a specific type of epigynum. Again there was no definite relationship. It appears that the variation in this species represents a case of genetic polymorphism and is not related to age or size, or caused by gravidity of the female.

That only one species is represented here seems certain if it is considered that: (1) all types of variants occur in local populations with no visible ecological differences, (2) internally the female genitalia are alike, (3) intermediates (Fig. 17) occur between epigynal types, and (4) there is only one male encountered, i.e. the male palpus shows no variation. The same kind of polymorphism that occurs in *O. aureus* is present in *O. acleistus* as well. Both species are extremely interesting because of this phenomenon and deserve further analysis, mainly because much of spider taxonomy in particular, and arthropod taxonomy in general, is based on the "invariability" of genitalic structure.

Structure. Length of 30 females, 5.0-7.3 mm, mean 6.0 mm; length of 26 males, 4.1-5.2 mm, mean 4.6 mm. Order of leg length I-II-IV-III. For comparison of certain diagnostic measurements of *O. aureus* with those of other species see Table II and Diagram 3.

Color. Female. Pattern variable, ranging from dark colored, well-marked individuals as in Figure 1 to lighter, less distinctly marked specimens as in Figure 3. Eye region dark brown, thickly clothed with white appressed hairs. Eyes circled in black with a black band running from each toward center of eye hexagon. Face pale yellow to cream or ivory. Vertical brown stripes beginning broadly under ALE, narrowing considerably at lower edge of clypeus and continuing to subdistal region of chelicerae.

Carapace cream colored to ivory. Wide submarginal stripes of brown spatulate hairs beginning below PLE and continuing

posteriorly to thoracic declivity. Well-marked specimens have in addition dark markings behind the PME and surrounding the thoracic groove, produced by appressed spatulate hairs.

Dorsum of abdomen white to cream colored. In well-marked individuals, white overlaid with brownish yellow spatulate hairs produces a golden appearance. Cardiac region with lanceolate marking of slightly darker color, outlined in brown. Lanceolate mark absent in many pale specimens. Pale central region of dorsum more or less extensive (compare Fig. 1 with Fig. 3) and bordered by dark brown or black. Two pairs of pale lateral indentations on posterior half of abdomen, accented with white hairs and directed anteriorly. Venter of abdomen cream colored with median longitudinal brown stripe from epigastric furrow to spinnerets.

Legs ivory. Distinct black median longitudinal stripes on ventral surfaces of femora I, II, and usually III. Stripes less distinct on femur IV, sometimes absent. Dusky markings on legs, more pronounced on distal ends of femora, tibiae and distal segments. Legs dusker on well-marked specimens.

Endites ivory with dark sclerotized outside borders, black scopulae. Labium cream colored, sometimes with dusky clothing of fine hair making it darker. Sternum ivory, dusky around margin, with conspicuous black hairs.

Specimens marked as in Figure 1 are characterized by a much greater abundance of scale-like spatulate hairs (both light and dark) that form the type of pattern illustrated. When these are rubbed away the specimens tend to become lighter in appearance and more like Figure 3.

Male. Pattern illustrated in Figures 27 and 28. Eye region dark brown to black. No white hairs present. Iridescent spatulate hairs from ALE to AME. Palpi velvety black with metallic blue sheen. Face dark orange-brown with dusky markings as in Figure 29, to almost entirely black. Some specimens have a definite black reticulum and most of the face and chelicerae black (Fig. 27). Vertical black stripes are often indistinguishable, being completely obliterated by black color on the chelicerae as well as on the clypeus.

Carapace light yellow-orange or golden. Dusky submarginal stripes beginning under PLE, curving dorsally and continuing to posterior declivity of thoracic region or submarginal stripes absent with the carapace almost glabrous, having only a few scattered spatulate hairs.

Dorsum of abdomen with broad median area of ivory to cream, covered with grayish scales in greater or less abundance. Bordered on sides by dark gray-brown. Venter cream to pale yellow with broad median longitudinal gray-brown stripe from epigastric furrow to base of spinnerets or venter almost entirely black with median stripe bordered by a thin pale line. Black patch over genital area, lung book covers pale yellow or cream. Iridescent scales usually numerous on venter.

Legs ivory with distinct black stripes on ventral surface of femora I and II, but these stripes only faintly represented on femora III and IV. Scattered dusky markings, usually on dorsal surface of leg segments. Femora with faint green metallic luster.

Endites pale yellow to ivory with outer edges dark brown, sclerotized. Usually lighter in color at distal ends, with black scopulae. Labium darker, brownish. Sternum ivory to cream.

Diagnosis. *Oxyopes aureus* is most similar to *O. acleistus*, which it resembles in coloration and in genitalic structure. These two species can be best differentiated by comparing the epigynum of *O. aureus* (Fig. 14) with *O. acleistus* (Fig. 19). For other differences see the discussion under the diagnosis of *O. acleistus*.

Natural history. In southern Texas adult males of *O. aureus* first appear in April and have been collected through September. Females appear in May and may be found as late as November. Adult individuals are most abundant in late June and early July. *Oxyopes aureus* was collected by sweeping grass and other herbaceous vegetation at Corpus Christi State Park and Bentsen State Park in southern Texas. These spiders were most abundant in relatively short vegetation (6-8 inches) in shaded areas, particularly under the cover of trees. At Corpus Christi Park they occurred in close proximity to *O. salticus*. The latter species, however, was much more abundant in open unshaded areas and in taller grass along the lake shore. Nearly all of the specimens of *O. salticus* that were collected from 28 June-1 July at the above localities were immature. Mature males and females of *O. aureus* were relatively abundant during this same period. At Goose Island State Park *O. aureus* was collected in sweeping Compositae. This species has been found in mud-daubers' nests, but it is not taken in great numbers by these wasps.

Distribution. Louisiana, Texas, and Mexico (Map 1).

Records. Louisiana. East Baton Rouge Par.: Baton Rouge,

June 1954, ♀ (NB). *Texas*. Aransas; Atacosa; Bee; Brazoria; Brewster; Calhoun; Cameron; Dallas; Harris; Hidalgo; San Patricio; Starr; Travis.

MEXICO. *Tamaulipas*. Rio Gualolejo near Forlon, 16 Apr. 1938, ♂ ♀ ♀ (LID, B. Brown). *San Luis Potosí*. Huichihm-ayan, 19 May 1952, ♂ (MAC, WJG, RS), 10 mi. N of Valles, 23 July 1945, ♂ (A. M. Dame).



Map 1

OXYOPES AGLOSSUS Chamberlin

Figures 9-12, 21, 22, 31, 32, 39, 40. Map 1.

Oxyopes aglossus Chamberlin, 1929, Ent. News, 40:17, figs. 1, 2, ♀, ♂. Female holotype from Billy's Island, Okefenokee Swamp, Georgia, in the American Museum of Natural History, examined. Roewer, 1954, Katalog der Araneae, 2(a):333. Bonnet, 1958, Bibliographia Araneorum, 2(4):3223.

Discussion. *Oxyopes aglossus* does not exhibit the polymorphism shown in *O. acleistus* and *O. aureus*. There is also little geographic variation in color over its entire range of distribution (see Map 1). The affinities of *O. aglossus* undoubtedly reside with *O. acleistus* and *O. aureus*, and it is considered to belong to the same species group.

Structure. Length of 30 females, 4.5-6.7 mm, mean 5.4 mm; length of 26 males, 3.9-4.8 mm, mean 4.4 mm. For comparison of certain diagnostic measurements of *O. aglossus* with those of other species see Table II and Diagram 3.

Color. Female. Pattern illustrated in Figures 9, 11 and 12. Eyes circled in black with black band leading from each eye toward center of eye hexagon. Eye region thickly clothed with white hair. Face cream to pale yellow. Black stripes beginning below AME and continuing to distal region of chelicerae.

Carapace cream to pale yellow. Wide brown submarginal stripes originating anteriorly below ALE and continuing to thoracic declivity. Often an irregular brown pattern behind PME and surrounding thoracic groove.

Dorsum of abdomen cream to pale yellow; often with white pigment underlying integument, pigment most conspicuous near anterior end of abdomen. Cardiac area pale, faintly outlined by darker brown spatulate hairs. Lateral areas brown or irregularly spotted with brown. Usually two pairs of indentations from pale central region into darker lateral areas are visible on posterior half. Venter of abdomen cream colored with broad median dark brown or black stripe from epigastric furrow to spinnerets.

Legs pale yellow. Ventral surfaces of femora I and II with black median longitudinal stripes; represented on femora III and IV only by a series of black dashes.

Endites pale yellow; sclerotized region around outer edges, brown. Labium pale yellow. Sternum cream to pale yellow.

Male. Pattern as illustrated in Figures 31 and 32. Eyes circled with black and with black bands extending toward center of eye hexagon. Iridescent scales from ALE to PME. Palpi black with iridescent blue sheen. Vertical black stripes from AME to distal region of chelicerae. Distal ends of chelicerae pale.

Carapace pale yellow-orange (golden) to brownish yellow. Broad dusky submarginal stripes. Vertical sides lighter in color than dorsal surface.

Dorsum of abdomen cream with lateral areas dark brown or almost black due to presence of dusky scales. Pink and lavender iridescence occurs wherever these gray scales are present, many times over entire dorsal surface. Venter with very wide dark brown to black stripe from epigastric furrow to spinnerets, bordered by pale lines. In some cases the entire ventral surface is dark gray-brown to black and heavily covered with scales. Genital region dusky with lung book covers pale.

Legs cream to yellow. Femora I and II with median ventral black stripe, stripes broken and indistinct on femora III and IV.

Endites cream to yellow with dusky markings along outer

edges. Labium cream to brownish yellow. Sternum pale cream to yellow.

Diagnosis. *Oxyopes aglossus* is most similar to *O. acleistus* and *O. aureus*. The chief similarities are in general color pattern, relative length of the legs, and particularly the male palpi (Figs. 35-40). Females of *O. aglossus* are easily separated from *O. acleistus* and *O. aureus* by the form of the epigynum (compare Fig. 22 with Figs. 14, 16 and 19, 20). The differences in the male palpus are in the conductor, which is more square at the distal end in *O. aglossus* (compare Fig. 40 with Figs. 36 and 38), and in the tibial apophysis, which has only a single tooth at the base in *O. aglossus* as opposed to two teeth in *O. acleistus* and *O. aureus* (compare Fig. 39 with Figs. 35 and 37).

Natural history. I have not collected this species in the field. In habits it is probably similar to *O. aureus* and *O. acleistus*. Many specimens of *O. aglossus* were included in vials with *O. salticus* so that they must have similar habitat preferences, that is, grass and other herbaceous vegetation. A number of specimens are from relatively high elevations in Tennessee and North Carolina, but there are also specimens from localities near sea level in Mississippi. Several specimens were recovered from the nest of *Sceliphron*.

Distribution. Virginia, Tennessee, North Carolina, south to Alabama, Mississippi, Louisiana, and west to Texas.

Records. *Virginia.* Fairfax Co.: Great Falls, 21 June, ♀ (NB). *Tennessee.* Grundy Co.: Beersheeba, June 1888, ♂. Knox Co.: Univ. of Tennessee Farm, 3 June 1951 ♂, 6 June 1951, ♀ (H. B. Reed); Knoxville, 14 July, ♀ (W. B. Cartwright). Loudon Co.: Lenoir City, 20 July 1903, ♂ (JHE). Robertson Co.: Greenbrier, 16 June 1939, ♂ (DCL); 30 mi. N of Nashville, 16 July 1933, ♀ (WJG). *North Carolina.* Avery Co.: Pineola, 14 July 1903, ♂ (JHE). Durham Co.: Duke Forest, Durham, 13-18 June 1933, 3 ♂ ♂ : 6 ♀ ♀ : 0 (AMC); 11-20 June 1953, ♂ 0 (HWL); 14 Sept.-11 Oct. 1935, ♀ (AMC). Orange Co.: Chapel Hill, July, ♂ (JHE). Transylvania Co.: Brevard, 3 July 1942, 3 ♂ ♂ : ♀ (Westfall). Wake Co.: Raleigh, May 1945, ♀, July 1912, ♀, 12 Aug. 1943, ♂ (CSB). *South Carolina.* Charleston Co.: McClellanville, July-Aug. 1945, ♀ (PV). Kershaw Co.: 4 mi. N of Cassatt, 12 June 1935, ♂ (WJG). *Georgia.* Okefenokee Swamp, Billy's Island, June 1912, ♂ ♀ ♀, Honey Island ♂ ♂, Mixson's Hammock, 16 June 1912, ♂ : 4 ♀ ♀ (CRC). Ware Co.: Wayeross, ♀. *Alabama.* Baldwin Co.: Silverhill, Apr.-May 1945, ♂, Aug. 1947, ♀ (GN). Clay Co.: Cheaha St. Pk., June

1940, ♂ (AFA). Lawrence Co.: Black Warrior Nat. Forest, June 1939, ♂ ♂ ♀ ♀ o (AFA). Tallapoosa Co.: Alexander City, 1-14 Aug. 1944, 3 ♀ ♀ (GN). Tuscaloosa Co.: Alberta City, June 1947, ♂ (AFA). *Mississippi*. George Co.: Lucedale, June 1932, ♂ ♀ (HD). Jackson Co.: 2-15 Sept. 1942, ♀ (BM). *Louisiana*. Grant Par.: Bayou Bouef, Bringham, 20 June 1941, ♂ (SEJ, AFA); State Forest, Woodworth, 21 June 1941, ♀ ♀, (SEJ, AFA). Winn Par.: Kisatche Forest, Winnfield, 13 July 1943, ♀. *Arkansas*. Conway Co.: 7 June 1962, ♂ (HEF), Plumerville, 12-18 June 1957, ♀ (L. Moore). *Texas*. Jasper Co.: 5 mi. N of Jasper, 6 June 1936, ♂ ♀ (SM).

OXYOPES OCCIDENS sp. n.

Figures 7, 8, 23-26, 33, 34. Map 1.

Holotype. Male from Sabino Pond, Sabino Canyon, Santa Catalina Mtns., Pima Co., Arizona, 10 July 1962 (A. R. Brady) in the Museum of Comparative Zoology. The specific name is a noun in apposition meaning the West.

Structure. Length of ten females, 5.5 - 8.4 mm, mean 6.9 mm; length of five males, 5.1 - 5.6 mm, mean 5.4 mm. Order of leg length I-II-IV-III. For comparison of certain diagnostic measurements of *O. occidentis* with those of other species see Table II and Diagram 3.

Color. Female. Pattern illustrated in Figures 7 and 8. Eyes ringed with black and with black bands directed toward center of hexagonal eye region. Eye region black, heavily clothed with white hairs. Face ivory to pale yellow. Vertical black stripes beginning under AME and continuing to subdistal region of chelicerae. Chelicerae slightly darker in color, heavily sclerotized outer margins dark brown.

Carapace ivory to pale yellow. Wide brown submarginal stripes, originating anteriorly under PLE and continuing diagonally upward and posteriorly to thoracic declivity. Brown dashes behind PME and at thoracic groove.

Dorsum of abdomen cream to pale yellow produced by white overlaid with more or less dense clothing of brown, flattened, elliptically-shaped hairs. Darker brown marking indicating cardiac region. Lateral areas dark brown with color becoming darker posteriorly. Dark brown or black dashes outlining the median pale stripe at posterior end, with a pair of pale indentations just anterior to these. Venter of abdomen with broad median longitudinal stripe of light brown, outlined with white

and the sides darker brown or area lateral to median dark stripe cream without darker markings.

Legs ivory to pale cream without any distinct darker markings. No black stripes on femora.

Endites pale cream to pale yellow with black scopulae at distal ends. Labium darker brown with reddish tinge. Sternum ivory to cream.

Male. Pattern illustrated in Figures 25 and 26. Eye region dark brown or black without white hairs. Iridescent scales over eye region producing a metallic lavender or green luster, most noticeable between ALE. Scales scattered over face as well. Palpi black, heavily clothed with long black hair.

Carapace cream to pale yellow with very light brown submarginal stripes formed by short hairs. Thoracic groove faintly indicated.

Dorsum of abdomen with median white area from base to spinnerets, giving off a pair of lateral white dashes posteriorly. Covered by very light brown spatulate hairs and scattered iridescent scales. Lanceolate mark of light brown in cardiac area. Venter with wide, brown, median longitudinal stripe, bordered by thin white lines on each side. Lateral area very light brown or tan.

Legs ivory to cream, without distinct darker markings.

Labium and endites cream with black scopulae at distal ends of endites. Sternum ivory.

Diagnosis. *Oxyopes occidentis* is similar to *O. aglossus* and bears some resemblance to *O. aelcistus* and *O. aureus*. With these three species *O. occidentis* constitutes what is termed in this paper the *aelcistus* species group. *Oxyopes occidentis* is the largest and most divergent member of this group and also the lightest in color. It can be easily distinguished from the other members of the group by its color pattern (Figs. 7 and 8) and especially the male or female genitalia (Figs. 33, 34 or Figs. 25, 26). *Oxyopes occidentis* is the only representative of this species complex in the western United States.

Natural history. This spider was collected from very dry, almost dead vegetation (primarily *Rumex* or "Dock" as it is commonly called) located near a pond. It exhibited excellent jumping ability, leaping among the dried stalks and leaves of *Rumex* when disturbed. This lynx spider could only be collected by quickly grabbing it with the hand. Sweeping of the vegetation did not yield a single specimen.

Distribution. Arizona (Map 1).

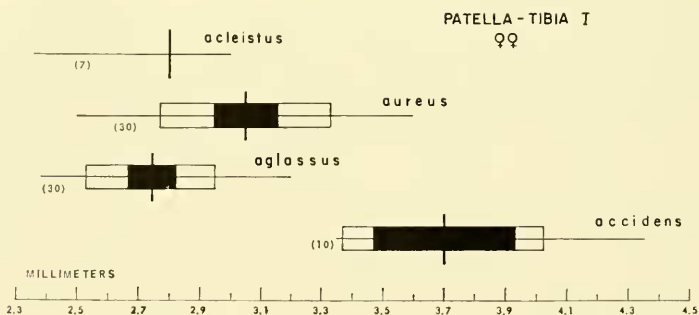
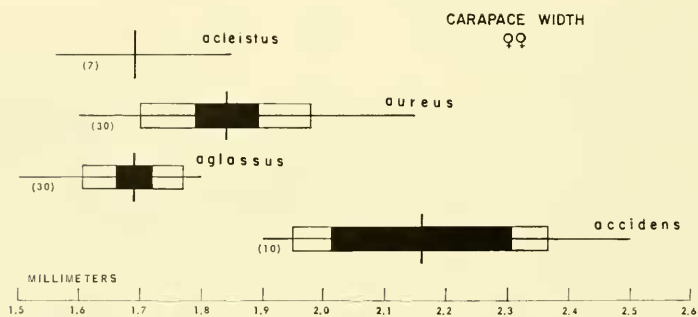
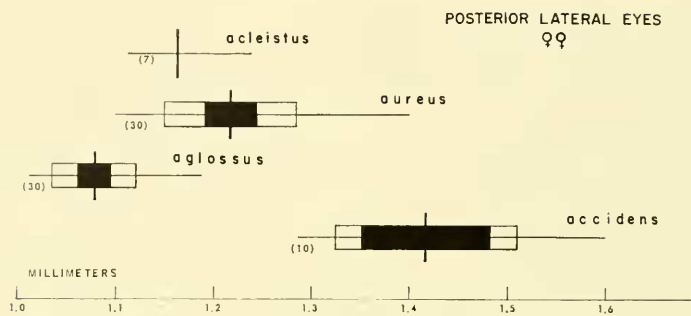


Diagram 3 — Measurements of the *Acleistus* Group.

Modified Dice-Leraas diagrams. The horizontal line represents the observed range, the open rectangle shows the standard deviation and the solid black rectangle indicates the 95 per cent confidence intervals for the mean. The mean is denoted by a vertical line and the number of specimens measured is given in parentheses.

Records. Arizona. Maricopa Co.: Phoenix, 17 Oct. 1960, ♀, (H. L. Stahnke). Pima Co.: Sabino Pond, Sabino Canyon, Santa Catalina Mtns., 26 June 1960, ♀ ♀ (JAB), 10 July 1962, 4 ♂ ♂ : ♀ (ARB), 2 Aug. 1962, ♀ (JAB); Univ. of Arizona, Tucson, 24 July 1962, ♂ (JAB). Yuma Co.: Yuma, 30 June 1957, ♂ : 5 ♀ ♀ (VDR).

OXYOPES APOLLO sp. n.

Figures 41, 42, 47-50, 72-75. Map 2.

Oxyopes helius: Bryant, 1936, Psyche, 36(4): 92, fig. 7, ♂, not *O. helius* Chamberlin.

Holotype. Male from Encino, Brooks Co., Texas, 12 May 1952 (M. Cazier, W. Gertsch, R. Schrammel) in the American Museum of Natural History. The specific name is a noun in apposition after the Greek god Apollo.

Discussion. The female holotype of *Oxyopes helius* was described from the Okefenokee Swamp, Georgia, by Chamberlin (1929). Bryant (1936) described what she thought was the male of *O. helius* Chamberlin from Kaufman, Texas, not realizing she had a new species, distinctly different from *O. helius*, a species now placed in the genus *Hamataliwa*.

Structure. Length of 30 females, 4.2 - 6.7 mm, mean 5.2 mm; length of 30 males, 3.4 - 4.4 mm, mean 3.8 mm. Order of leg length IV-I-III-III. For comparison of certain diagnostic measurements of *O. apollo* to those of other species see Table II and Diagram 4.

Color. Female. Pattern illustrated in Figures 41 and 42. Eyes circled in black. Eye region dark brown to black. Face yellow-orange or golden with vertical brown stripes beginning under ALE, widest at AME, narrowing sharply at the lower edge of the clypeus and continuing diagonally to outer margins of chelicerae, midway of basal segment.

Carapace yellow-orange or golden, mostly glabrous. Wide dark brown, irregularly notched and branching submarginal stripes beginning below PLE and continuing to posterior thoracic declivity. Vertical sides yellow-orange, clothed with scattered white hairs.

Dorsum of abdomen with broad median cream to white stripe from base to tip of spinnerets, enclosing a cream colored lanceolate mark over the cardiac region. Brown along margins. Venter with wide brown median longitudinal stripe composed of three indistinct dark bands enclosing two paler ones. Median stripe outlined by white, lateral areas brown.

Legs pale to brownish yellow. Dusky markings heaviest on distal ends of femora, proximal ends of tibiae and ventral surfaces of legs.

Labium brownish yellow to dark brown. Endites brownish yellow with outer margins and distal ends darker gray-brown, except at anterior tip. Sternum cream to yellow with dark brown around margins.

Male. Eye region mostly dark brown or black. Cymbium and leg segments of palpus dark brown. Face yellow-orange or golden with brown stripes originating under ALE, widest at AME, narrowing at clypeus and continuing diagonally to margin of chelicerae midway the length of basal segment. Chelicerae with dark brown distal end.

Carapace glabrous, yellow to golden with submarginal dark brown longitudinal markings similar to those of the female.

Dorsum of abdomen with median longitudinal white stripe enclosing darker lanceolate mark over cardiac region. Lateral areas dark brown or black, sometimes with lighter maculations. Venter of abdomen with brown median stripe from epigastric furrow to base of spinnerets, enclosed by narrow white or yellow stripes. Lateral areas dark brown, usually with pale spots on sides.

Legs yellow to brownish yellow; dusky markings at distal regions of femora, proximal and central portions of tibiae. Markings on femora more pronounced ventrally.

Labium dark brown. Endites dark brown, particularly along margins, with interior color sometimes lighter yellow. Sternum yellow with dark brown perimeter.

Diagnosis. *Oxyopes apollo* is very similar to *O. floridanus* in structure, color, and in the form of the female genitalia. The chief difference between the two species is in the structure of the patellar apophyses of the males (compare Figs. 74, 75 with Figs. 78, 79). In *O. apollo* the knob of the retrolateral process of the apophysis is much larger than in *O. floridanus*. The specimens of *O. floridanus* have a dense clothing of appressed white hair covering much of the entire body, including the legs, while in *O. apollo* the carapace is often glabrous and there are fewer hairs scattered over the body. If one handles the specimens, the white prostrate hairs are rubbed off, but because a great number of specimens of *O. apollo* were found to have the glabrous carapace, it is probably genuine and not artificially produced. Since the geographic ranges of *O. apollo* and *O.*

floridanus are completely disjunct, based on the material examined, further collections in the interlying area will certainly elucidate their relationship.

In Texas, mature individuals of *O. apollo* seem to be most abundant from May through August. In the southern parts of its range, however, adult males and females of this species have been collected from March through November.

Natural history. Not much is known of the habits or habitat of *O. apollo* despite the large numbers in collections. *Oxyopes apollo* is sympatric over most of its range with *O. salticus*, but, unlike *O. aglossus*, which often appears in collections of *O. salticus*, *O. apollo* is not taken with *O. salticus*. In Arkansas, *O. apollo* has been captured in pitfall traps, not by sweeping as are *O. salticus* and *O. aglossus*.

Distribution. Tennessee, Missouri, Arkansas south through Oklahoma and Texas, west to Arizona and south through Nuevo Leon and Chihuahua to Hidalgo (Map 2).

Records. *Tennessee.* Roane Co.: 1 mi. E of Kingston, 12 July 1933, ♀ (WI). *Missouri.* Phelps Co.: Rolla, 9 Sept. 1937, ♀ (RHC). *Arkansas.* Conway Co.: Morrillton, 25 July 1962, 15 ♂♂:♀ (HEF). Washington Co.: Fayetteville, Aug. 1909, ♀ (R. Thaxter). *Louisiana.* Ascension Par.: Sorrento, 12 Aug. 1938, ♀ (AMD). *Oklahoma.* Harmon Co.: ♀♀. Pawnee Co.: 1.5 mi. W of Cleveland, 16 Aug. 1956, ♀ (MH). *Texas.* Anderson; Brazos; Brewster; Brooks; Hidalgo; Kaufman; Kleberg; Llano; Maverick; Polk; San Patricio; Somervell; Terrell. *New Mexico.* Eddy Co.: 16 mi. S of Artesia, 23 Sept. 1950, ♀ (WJG). *Arizona.* Organ Pipe Cactus Nat. Monument, 3-7 Aug. 1910, ♀.

MEXICO. *Tamaulipas.* San Pedro, May 1936, ♂:8 ♀♀ (W. A. Green). Santa Teresa, 15 May 1952, 3 ♀♀:♂ (MAC, WJG, RS). *Nuevo Leon.* N of Monterey, 8 Aug. 1942, ♂. *Chihuahua.* 50 mi. S of Villa Ahumada, 11 June 1939, ♂ ♀ ♀♂ (AMD, LID). *Hidalgo.* 10 mi. N of Ixmiquilipan, 5 July 1941, ♂ (AMD).

OXYOPES FLORIDANUS sp. n.

Figures 43, 44, 51, 76-79. Map 2.

Holotype. Male from Volusia Co., Florida, 1 Apr. 1939 (H. K. Wallace) in the Museum of Comparative Zoology. The specific name is an adjective referring to the state of Florida.

Structure. Length of eight females, 4.0-6.3 mm, mean 4.8 mm; length of two males 3.8 and 4.0 mm. Order of leg length IV-I-II-III. For comparison of certain diagnostic measurements

of *O. floridanus* with those of other species see Table II.

Color. Female. Pattern illustrated in Figures 43 and 44. Eyes circled in black with black band from each, directed toward center of eye hexagon. Eye region dark brown, lighter amber in center. Face brownish yellow, pale yellow along lower edge of clypeus. Lighter areas clothed with appressed white hair, especially along sides of face. Vertical brown stripes beginning under ALE, widest at AME, narrowing at clypeus and continuing diagonally to lateral margins midway down chelicerae.

Carapace light, brownish yellow or golden, with irregular brown pattern as illustrated in Figure 44. Vertical sides light brownish yellow, densely clothed with white hair especially along lower margins.

Dorsum of abdomen with broad median stripe of pale yellow; numerous brown chevrons crossing this stripe posteriorly. Cardiac region with pale brown lanceolate mark. Clothing of ovoid to elliptical flattened hairs forming white patches and giving the abdomen a mottled appearance. Venter of abdomen with wide dark brown stripe from epigastric furrow to base of spinnerets. Median stripe bordered by thin pale brownish yellow to cream stripes. Lateral areas paler than median, brown mottled with brownish yellow to cream. Entire venter overlaid with white hair.

Legs brownish yellow with dusky markings at distal ends of femora and at proximal, central and distal ends of tibiae. Scattered clothing of white flattened hairs heaviest on femora.

Labium brown. Endites brownish yellow with dusky lateral margins; distal ends pale cream. Sternum yellow with dark brown margin, heavily covered with white appressed hair.

Male. Eyes circled in black. Eye region dark brown, almost black. Iridescent scales between AME. Palpi dark brown to black. Face orange-brown with reticulate black markings in one specimen, or entire center of face from ALE to clypeus dark brown in the other case. Dark median area bounded on each side by paler yellow. An indistinct black line from AME to edge of clypeus in one specimen.

Carapace golden brown with wide dark brown longitudinal stripes that have irregular branches and indentations (Fig. 77). Vertical sides golden brown with dense clothing of flattened white hair.

Dorsum of abdomen with central region of pale cream to brownish yellow, covered by dense clothing of translucent scales. Cardiac region outlined with brown. Lateral area brown

with scattered patches of white hair posteriorly. Venter with wide brown median stripe, margined by pale lines. Lateral area brown, mottled with white or yellow. Entire venter covered with scattered iridescent scales. Spinnerets pale yellow.

Legs brownish yellow to yellow with scattered dusky markings, more pronounced on ventral surfaces.

Labium dark brown. Endites dark brown with inner margins of distal ends pale. Sternum yellow with dark brown margin.

Diagnosis. *Oxyopes floridanus* is very similar to *O. apollo*. The primary differences are in the patellar apophyses of the males (compare Figs. 78, 79 with Figs. 74, 75). Since *O. floridanus* is completely allopatric to *O. apollo*, it may be considered only as a geographic race of *O. apollo* when more information becomes available. There are no perceptible differences in the male palpus of *O. apollo* throughout its range from Tennessee to northern Mexico. The male palpus of *O. floridanus*, however, is different from *O. apollo*, and I suspect that this difference would be one of the first brought about by selection pressure during the process of speciation. It appears to me that *O. floridanus* is isolated from *O. apollo*, not only geographically, but genetically as well.

Distribution. Florida (Map 2).

Records. Florida. Desoto Co.: Peace River near Arcadia, 30 Mar. 1938, 6 ♀♀ (WJG). Duval Co.: 17 Apr. 1949, ♂. Lake Co.: Altoona, ♀♀ (NB). Levy Co.: 2 Mar. 1946, ♂ (HKW). Volusia Co.: 1 Apr. 1939, ♂ (HKW).



Map 2

OXYOPES TRIDENS sp. n.

Figures 45, 46, 53-55, 62, 63, 70, 71. Map 2.

Holotype. Male from Mercury, Nye Co., Nevada, 4 July 1961 (CBA3C) in the American Museum of Natural History. The specific name is an adjective meaning trident.

Structure. Length of 26 females 5.5 - 7.6 mm, mean 6.3 mm; length of 25 males 4.9 - 6.4 mm, mean 5.5 mm. Order of leg length IV-I-II-III. For comparison of certain diagnostic measurements of *O. tridens* with those of other species see Table II and Diagram 4.

Color. Female. Pattern illustrated in Figures 45 and 46. Eye region dark brown with streak of white hairs running from PLE and ALE to PME where it joins white hair of face. Face white from dense clothing of flattened hairs. Wide vertical dark brown stripes originating under ALE, diminishing in size at lower edge of clypeus and continuing to subdistal region of chelicerae. Inner margins and distal ends of chelicerae brown.

Carapace with broad central longitudinal white region, clothed entirely with white hair. Anteriorly this hair forms a trident, the middle prong going between the PME and each of the lateral prongs pointing to a PLE. Broad submarginal stripes of dark brown beginning under ALE and continuing to thoracic declivity. Vertical sides of carapace white.

Dorsum of abdomen with median longitudinal white stripe from base to spinnerets, enclosed on each side by dark brown or black. The dark lateral areas sometimes mottled with white. Venter of abdomen with median brown stripe from epigastric furrow to base of spinnerets, bordered on each side by a thin white line. Lateral area brown, but entire venter often with a clothing of white hairs moderating darker colors.

Legs pale yellow with dusky streaks, especially on ventral surfaces of femora and tibiae. Scattering of white hairs over lower leg surfaces is common. Distal segments are usually somewhat darker.

Endites cream to light brownish yellow with outer margins and sometimes inner margins dusky. Distal ends ivory with black scopulae. Labium pale yellow, grayish along sides with anterior edge ivory.

Male. Pattern illustrated in Figures 62 and 63. Eye region with fewer white hairs than in female. Palpi dark brown or black. The color and markings of the face, carapace, abdomen,

legs and other parts of the body are like those of the female and there is very little dimorphism between the sexes.

Diagnosis. *Oxyopes tridens* is similar in coloration to *O. pardus*, *O. lynx* and *O. felinus*. Together with these species it forms a distinct species complex related to *O. floridanus* and *O. apollo* in the East. All of the species found in the West appear much the same, with a longitudinal white stripe bordered by black stripes extending the length of the body. *Oxyopes tridens* is the species most often collected in Arizona and the male is easily separated from other species in this group by the patellar apophysis of the palpus (Figs. 70, 71). The female of *O. tridens* is readily identified by the shape of the epigynum (Figs. 53-55), but to date the females of *O. pardus*, *O. lynx* and *O. felinus* have not been collected and it is not known how much they differ from *O. tridens*.

Natural history. According to W. J. Gertsch (pers. com.) this species is only rarely found on vegetation. It is often seen jumping over rocks in rough outcrops and running over bare ground. This lynx spider has also been collected from the walls of buildings. Of the species I have collected that belong to the *tridens* group, none were found on vegetation. Several were collected in areas where moss was growing and moisture was readily available, but others were collected as they were hopping about over rather dry hillsides. All of my specimens but one are males, however, and these tend to wander more than the females. It is possible that the members of the *tridens* group do not commonly occur on vegetation, as do most other lynxes, but prefer barren hillsides, bare rock outcrops and similar habitats. In many of the vials of *O. tridens* examined during this study only one specimen was present, and only four vials contained more than three specimens. This suggests that *O. tridens* has probably not been collected much by sweeping, since many specimens are found in a single vial where this method is employed. This provides indirect evidence as to the habitat preferences of *O. tridens*.

Distribution. Western Texas to southern Nevada and California, south to Sonora and Coahuila (Map 2).

Records. *Texas.* Brewster Co.: Marathon, 1-2 July 1916, 3 ♀ ♀ (F. E. Lutz); top of Chisos Mtns., Big Bend Nat. Pk., 25-26 July 1933, ♀ (SM). *Arizona.* Maricopa Co.: Phoenix, summer 1959, 6 ♂ ♂. Pima Co.: Organ Pipe Cactus Nat. Monument, ♀ ♀, 14 June 1952, 700 (MAC, WJG, RS), 3-7 Aug. 1910,

♀ ♀, 4-7 Aug. 1916, ♀; Sabino Canyon, Santa Catalina Mtns., 1 Sept. 1939, ♀ (RHC), 3 Sept. 1950, ♀ (WJG); Tucson, ♂ ♂ (O. Bryant), May 1940, o, 20 May 1941, ♀ (RHC), 20 June 1961, ♂, 20 Aug. 1961, ♂ (JAB). Yuma Co.: Yuma, May 1958, ♂, May-June 1956, ♂, 30 June 1957, 3 ♂ ♂ : 4 ♀ ♀ : o (VDR). Nevada. Nye Co.: Mercury, 24 June 1961, ♂, 29 June 1961, ♀, 4 July 1961, ♂, 14 July 1961, ♂, 18 July 1961, ♂, 25 July 1961, ♀. California. Imperial Co.: Palo Verde, 14 June 1961, ♂ (VDR). Los Angeles Co.: Acton, 5 Aug. 1931, ♀ (WI). San Bernardino Co.: Twenty-nine Palms, 1-15 July 1945, ♂, July-Aug. 1945, 3 ♂ ♂ (J. H. Branch). San Diego Co.: 5 mi. E of Jacumba, 9 July 1960, o (W. F. Barr).

MEXICO. Coahuila. La Gloria, 24 Aug. 1947, ♀ (WJG); 20 mi. E of San de las Colonias, 5 July 1936, ♀ (AMD, LID). Chihuahua. Samalayuca, 25 June 1947, ♂ (WJG). Sonora. El Desemboque, 1-10 Sept. 1953, ♂ (BM); 25 km S of Desemboque, 11 Aug. 1953, ♀ (BM); 10 mi. S of Hermosillo, 16 June 1939, ♀ (AMD, LID).

OXYOPES PARDUS sp. n.

Figures 60, 61, 68, 69. Map 2.

Holotype. Male from South Fork of Cave Creek Canyon, Chiricahua Mtns., Cochise Co., Arizona, 8 July 1962 (J. A. Beatty) in the Museum of Comparative Zoology. The specific name is a noun in apposition meaning panther.

Structure. Length of two males 4.7 and 5.0 mm. Order of leg length IV-I-II-III. For comparison of certain diagnostic measurements of *O. pardus* with those of other species see Table II.

Color. *Male*. Pattern illustrated in Figures 60 and 61. Eye region glossy black. Palpi black, thickly clothed with black hair. Iridescent scales between ALE and scattered over clypeus. Face black, with lateral areas paler.

Black color from face continuing posteriorly as two broad submarginal stripes, bounded laterally by yellow. Central area of carapace pale yellow. Vertical sides below black stripes yellow, clothed with white hairs especially along margins of carapace in one specimen.

Dorsum of abdomen with broad median stripe of yellow, clothed with white hair, bordered on each side by black. In one specimen the black is mottled with yellow. In the other, the

pale median stripe becomes suffused with gray posteriorly. Venter with broad median dark band from epigastric furrow to spinnerets, bounded on each side by lighter yellow spotted with black in one case. In the other specimen, the venter is entirely black with abundant iridescent scales. This specimen also has iridescent scales on ventral surfaces of femora.

Legs yellow, but with femora appearing gray due to dusky markings. Tibiae and more distal leg segments paler yellow; one specimen has the ventral surface of leg segments dusky.

Endites and labium black with distal ends white. Sternum cream colored with gray around margin.

Diagnosis. *Oxyopes pardus* is similar in coloration to *O. tridens*, *O. lynx* and *O. felinus*. All four of these species have the same general coloration (Figs. 56-63). The face of *O. pardus* is much darker than any specimens of the other three species, and it is immediately recognized by the form of the patellar apophysis (Figs. 68, 69). In addition to similar color patterns, the males of the four species above, with the exception of *O. felinus*, each have a well-developed apophysis on the patella, as well as a modification of the tibia.

Natural history. One male of *O. pardus* was collected in the late morning as it was jumping from rock to rock over a rather barren hillside. The other specimen was collected as it ran across an open trail with little ground cover.

Records. *Arizona.* Cochise Co.: Chiricahua Mtns., South Fork of Cave Creek Canyon, 8 July 1962, ♂ (JAB); Southwestern Research Station, 6 July 1962, ♂ (ARB).

OXYOPES LYNX sp. n.

Figures 58, 59, 66, 67. Map 2.

Holotype. Male from Marathon, Brewster Co., Texas, 12 June 1948 (M. A. Cazier) in the American Museum of Natural History. The specific name is a noun in apposition after the *Lynx*.

Structure. Length 5.0 mm. Order of leg length IV-I-II-III. For comparison of certain diagnostic measurements of *O. lynx* with those of other species see Table II.

Color. Male. Pattern illustrated in Figures 58 and 59. Eye region black with lighter yellow area in center of hexagon. Face yellow-orange or golden. Vertical stripes of a darker brownish, beginning under ALE and continuing to lower edge of chelicerae, only faintly indicated on chelicerae.

Carapace with median area yellow. Dark brown submarginal stripes from eye region to posterior declivity. Marginal vertical sides clothed with white pubescence.

Dorsum of abdomen with broad white median longitudinal stripe from base to tip of anal tubercle, bordered on each side by black. Black regions with translucent scales. Venter of abdomen dark brown, almost black with translucent, iridescent scales present.

Legs yellow with faint dusky markings on ventral surfaces.

Labium and endites yellow. Sternum cream colored with faint dusky markings along margin.

Diagnosis. *Oxyopes lynx* is related structurally and in general color pattern to the western members of the *tridens* species group, including that species, *O. pardus* and *O. lynx*. *Oxyopes lynx* is identified by the peculiar shape of the patellar apophysis (Figs. 66, 67) that separates it distinctly from these closely related species.

Chamberlin and Ivie (1944) described a species from the Georgia region of the United States and identified it as *O. lanceolatus* (Walekenaer). Their illustration (Chamberlin and Ivie, 1944, fig. 180) is a retrolateral view (similar to Fig. 66) showing the patellar apophysis. The apophysis of *O. lanceolatus* figured by Chamberlin and Ivie bears a strong resemblance to that of *O. lynx*, and *O. lanceolatus* undoubtedly belongs in the *tridens* species group. Unfortunately, the specimen of *O. lanceolatus* has been misplaced or lost and was not available for examination. An investigation of eastern material did not reveal any specimens resembling its description.

Natural history. Presumably *O. lynx* is similar in ecology to other members of the *tridens* group. Refer to the discussion under the natural history of *O. tridens*.

Records. Texas. Brewster Co.: Marathon, 12 June 1948, ♂ (MAC).

OXYOPES FELINUS sp. n.

Figures 56, 57, 64, 65. Map 2.

Holotype. Male from Molino Basin, Santa Catalina Mts., Pima Co., Arizona, 12 July 1962 (A. R. Brady) in the Museum of Comparative Zoology. The specific name is an adjective meaning cat-like.

Structure. Length of male 4.6 mm. Order of leg length IV-I-

II-III. For comparison of certain diagnostic measurements of *O. felinus* with those of other species see Table II.

Color. Male. Eye region black, iridescent scales from ALI to AME. Palpi black. Face yellow-orange or golden, with two

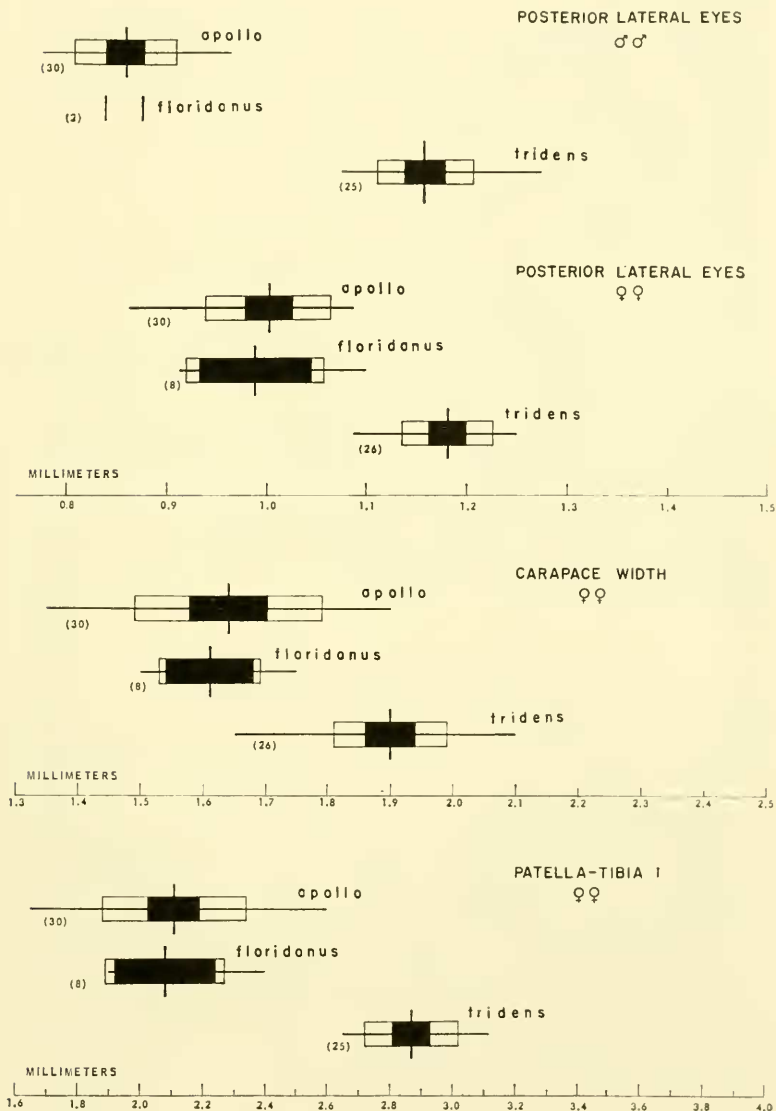


Diagram 4 — Measurements of the *Apollo* Group.

For interpretation refer to Diagram 3.

broad vertical black stripes beginning at ALE and continuing to subdistal region of chelicerae. Few scattered scales on face.

Carapace pale yellow. Broad submarginal black stripes from eye region to posterior declivity. Vertical sides of carapace pale yellow.

Dorsum of abdomen with white median longitudinal stripe from base to tip of spinnerets, bordered on each side by jet black. Venter of abdomen black with metallic sheen of lavender or green. Region above epigastric furrow yellow with black patch over the genital region.

Legs yellow with slight dusky markings on ventral surfaces. Legs much lighter than in *O. pardus*.

Labium yellow with black margins, not heavily scopulate. Endites yellow with black scopulae. Sternum pale yellow with dusky marginal markings.

Diagnosis. *Oxyopes felinus* is similar in coloration to *O. tridens*, *O. lynx* and *O. pardus*. It does not have a conspicuous patellar apophysis as in the other western species of the *tridens* group, but the color pattern, relative length of the legs and genitalia relate it to this group. *Oxyopes felinus* is most easily recognized by the structure of the male palpus (Figs. 64 and 65).

Natural history. The single male specimen was collected as it ran over very dry vegetation on a rocky slope.

Record. Arizona. Pima Co.: Molino Basin, Santa Catalina Mtns., 12 July 1962, ♂ (ARB).

OXYOPES SALTICUS Hentz

Figures 80-86, 91-96, 104-105. Map 3.

- Oxyopes salticus* Hentz, 1845, Boston Jour. Nat. Hist., 5:196, pl. 16, fig. 10, ♀. Female syntypes from North Carolina and Alabama, lost. Hentz, 1875, Occ. Pap. Boston Soc. Nat. Hist., 2:47, pl. 6, fig. 10, ♀. Emerton, 1902, Common Spiders of the U. S., Boston, p. 88, figs. 218-219, ♂, ♀. Montgomery, 1902, Proc. Acad. Nat. Sci. Philadelphia, 54:590, fig. 52, ♀. Comstock, 1912, The Spider Book, p. 660, fig. 773, ♀; *op. cit.*, rev. ed., 1940, p. 668, fig. 733, ♀. Chamberlin, 1929, Ent. News, 40:18, fig. 5, ♀. Kaston, 1948, Bull. Connecticut State Geol. Nat. Hist. Survey, 70, figs. 1147-48, ♀. Roewer, 1954, Katalog der Araneae, 2(a):333. Bonnet, 1958, Bibliographia Araneorum, 2(4):3240.
- Oxyopes astutus* Hentz, 1845, Boston Jour. Nat. Hist., 5:197, pl. 17, fig. 1, ♂. Male holotype from Alabama, lost.
- Oxyopes gracilis* Keyserling, 1877, Verh. Zool.-Bot. Ges. Wien, 26:698, pl. 2, figs. 63, 64, ♀ (in part, but not type).

Discussion. *Oxyopes astutus* Hentz, is the male of *O. salticus*. *Oxyopes luteus* Blackwall (1862) and *O. varians* Taczanowski (1873), described from Brazil and French Guiana, respectively, have been erroneously placed in synonymy with *O. salticus* (see Bonnet, 1958, and Roewer, 1954). Keyserling (1877) described *O. gracilis* from the United States, Central and South America. He was dealing with several species. Syntypes are from New Granada (Panama, Ecuador, Peru, Colombia, Venezuela) and this name should be associated with the Central and South American species of *Oxyopes*. The species described as *O. gracilis* Keyserling by F. O. Pickard-Cambridge (1902) is one of the most common *Oxyopes* of Mexico and Central America, and is very similar to *O. salticus*. The male palpus of *O. gracilis* (Figs. 102, 103) is distinct from *O. salticus* (Figs. 104, 105) and so far as I have determined *O. gracilis* occurs from central Mexico southward to Brazil. *Oxyopes salticus* apparently reaches the southern limit of its range in northern Mexico.

Banks (1902, 1903, 1909) reports *O. salticus* from Puerto Rico, Haiti, and Cuba. I have examined very extensive collections from Cuba and smaller ones from Haiti and Puerto Rico and *O. salticus* does not appear in these. Instead, Banks was probably dealing with a closely similar, but very distinct species described from Haiti by Bryant (1948). This species, *O. ercwi* Bryant, is abundant in collections from Cuba and evidently replaces *O. salticus* on the islands of Cuba, Haiti and Puerto Rico.

Structure. Length of 30 females 4.6-7.4 mm, mean 5.9 mm; length of 30 males 3.9-5.9 mm, mean 4.7 mm. Order of leg length I-II-IV-III or I-II=IV-III. For comparison of certain diagnostic measurements of *O. salticus* with those of other species see Table II and Diagrams 5 and 6.

Color. Female. Pattern illustrated in Figures 85 and 86. Eye region heavily clothed with white appressed hairs; when rubbed off, the eye region is dark brown to black. Face cream to ivory, white along lower edge of clypeus and distal ends of chelicerae. Black markings along posterior margins or "cheeks" of face as in Figure 85. Vertical black lines from AME to subdistal region of chelicerae.

Carapace pale cream to ivory, with two pairs of dark lines formed by flattened hairs, beginning behind PLE and continuing to thoracic declivity.

Dorsum of abdomen white with cardiac region clothed with

white hair and outlined with brown. Two brown stripes posterior to cardiac region formed by appressed hairs. Lateral areas of abdomen dark brown to black with irregular streaks of white hair on the sides. White pigment deposited beneath the integument so that if the clothing of white and contrasting brown hair is rubbed off, the abdomen appears chalk white with the cardiac area translucent white and no darker color laterally. Venter of abdomen with a wide median stripe of brown to black from epigastric furrow to base of spinnerets. Spinnerets pale cream to yellow. Median stripe bounded by white. Lateral areas pale yellow.

Legs pale yellow to cream with longitudinal black stripes on ventral surfaces of femora I, II and III; absent on IV.

Endites pale yellow to cream with distal ends ivory; scopulae black. Labium pale yellow with gray along lateral margins, tip ivory. Sternum pale yellow to cream.

Male. Patterns illustrated in Figures 80-84. Eyes with black band extending from each toward center of eye hexagon. Center of hexagon pale yellow or cream. Eye region glossy; no clothing of white hairs. Iridescent scales between ALE. Face pale yellow to cream. A pair of black marks at margins of face as illustrated in Figure 81. Vertical black lines from AME to subdistal region of chelicerae. Distal ends of chelicerae pale cream. Face between black lines black, and black on chelicerae as indicated in Figure 81, or the vertical lines alone are black as in Figure 83.

Carapace pale yellow to gold with scattering of spatulate appressed hairs sometimes forming faint longitudinal stripes, but never as distinctly as in the female.

Dorsum of abdomen black with covering of iridescent scales giving it a metallic lavender or blue-green luster (Fig. 82). In the field these scales make the abdomen appear golden in bright sunlight. The abdomen ranges from black, as above, to pale yellow tinged with gray (Fig. 84). Cardiac region gray, outlined with pale yellow; scattered glistening scales on the dorsum of lighter individuals. Venter of abdomen black with metallic blue-green or lavender sheen posterior to epigastric furrow. Black patch over genitalic region with areas lateral to this patch yellow. This pattern is found in dark specimens as in Figure 82. The venter may also have a wide median stripe of brown to black, margined with pale lines and the lateral areas pale brownish yellow. This coloration is found in light individuals, as in Figure 84.

Legs pale yellow to cream. Distinct black longitudinal lines on ventral surfaces of femora I, II, III; absent in IV.

Endites yellow to cream with black shading on outer margins or without dusky markings. Labium darker, sometimes brown with distal end pale yellow or cream. Sternum pale yellow or cream, usually with black spots around margin.

Diagnosis. *Oxyopes salticus* resembles the members of the *acleistus* group in coloration. The black stripes on the femora and the vertical black lines on the face are as in *O. aglossus*. *Oxyopes salticus* is immediately identified by the peculiar shape of the epigynum (Figs. 91, 93, 96) and the characteristic palpus of the male (Figs. 104, 105). The male palpus has a very stout conical protrusion of the cymbium not as well developed in any other species of *Oxyopes* north of Mexico. Also, a stout brush of short, stiffened bristles (not figured) on the ventral surface of the palpal tibia separates the male of *O. salticus* from all other males.

Natural history. *Oxyopes salticus* is one of the most common spider inhabitants of tall grass and herbaceous vegetation and is found throughout the United States wherever this type of vegetation occurs. During certain seasons, usually mid-June to September, these lynx spiders can be collected in great numbers from vegetation with the aid of a sweep net. The local abundance of these spiders gives evidence of their role as one of the chief predators of insects occurring in grassy or weedy fields and similar habitats. Evidently *O. salticus* is an important predator of certain crop insects, such as those on cotton (Whitecomb, *et al.*, 1963).

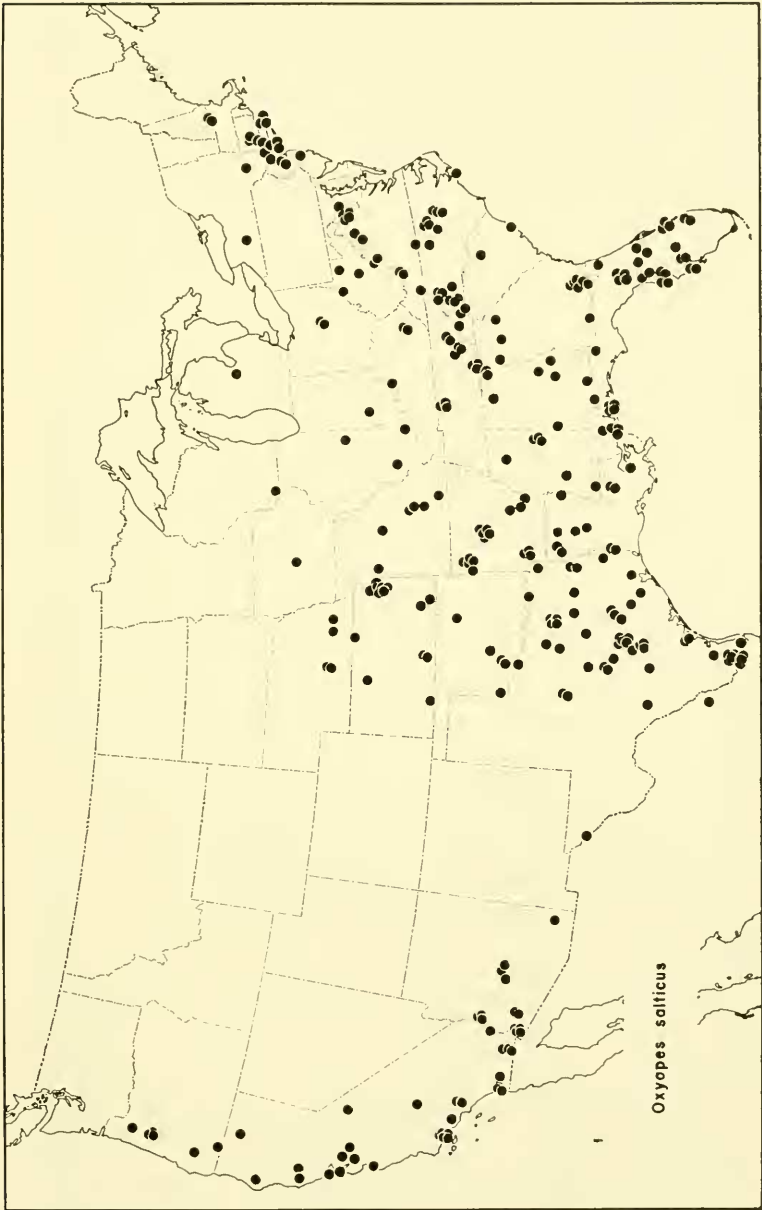
As it seeks prey over leafy or grassy vegetation, *O. salticus* assumes a characteristic pose, raising and extending the long front legs and resting on its hind legs. This prey-catching posture is similar to the attitude of some misumenoid crab spiders. Unlike the crab spiders, however, this lynx spider moves about stealthily and pursues its prey more readily, thanks to relatively keen eyesight. If alarmed, *O. salticus* bounds and springs over and through the vegetation with great energy and agility. The leaps of this lynx spider exceed even those of most of the salticids, renowned for their jumping ability. *Oxyopes salticus* is more slender than most Salticidae and its fourth pair of legs is stoutly constructed and well suited for hurling this spider through the air.

Several leaves of grass or similar vegetation are tied together

by *O. salticus* or it employs an appropriate small bush or plant to deposit its egg case. Once the egg case is constructed it is fixed among the leaves and twigs with many silken lines forming a tangled meshwork of silk. The female then stands guard over its future progeny much as a mother hen sitting on her nest of eggs. In several hundred vials containing *O. salticus*, only two egg cases were discovered. These were roughly spherical and about 3.5 mm in diameter; one contained 55 spiderlings and the other 18-20 eggs, each a little less than 1 mm in diameter. The extreme rarity of egg cases in collections is probably due to the method used in collecting these spiders. In sweeping, the spiders are dislodged from the vegetation, but the egg cases remain firmly attached.

Distribution. Throughout the United States (Map 3).

Records. County records only are listed. For complete records refer to the Doctoral Dissertation. *New Hampshire.* Hillsboro. *Connecticut.* Fairfield; New Haven. *New York.* Livingston; Nassau; Suffolk; Ulster; Westchester. *New Jersey.* Bergen; Morris; Ocean. *Ohio.* Knox. *District of Columbia.* *West Virginia.* Marion; Pleasants; Pocahontas; Upshur. *Virginia.* Arlington; Bath; Fairfax; Giles; Page; Pittsylvania; Rockingham. *Kentucky.* Breathitt; Jefferson. *Tennessee.* Hamilton; Knox; London; Roane; Robertson. *North Carolina.* Avery; Buncombe; Burke; Carteret; Durham; Guilford; Haywood; McDowell; Mitchell; Orange; Transylvania; Wake; Yancey. *South Carolina.* Charleston; Kershaw. *Georgia.* Clarke; Dade; Floyd; Fulton; Thomas; Ware. *Florida.* Alachua; Citrus; Desoto; Duval; Highlands; Hillsborough; Indian River; Jackson; Lake; Martin; Orange; Palm Beach; Pasco; Pinellas; Sarasota; Volusia. *Alabama.* Baldwin; Covington; Escambia; Lee; Montgomery; Morgan; Tallapoosa. *Mississippi.* George; Hinds; Jackson; Lafayette; Oktibbeha; Wilkinson. *Louisiana.* Caddo; East Baton Rouge; Grant; Lincoln; Madison; Natchitoches; Orleans. *Michigan.* Midland. *Indiana.* Green; Posey. *Wisconsin.* Lafayette. *Illinois.* Champaign; Washington. *Iowa.* Story. *Missouri.* Boone; Carter; Dent; Jackson; Phelps. *Arkansas.* Conway; Crawford; Deshea; Hempstead; Jefferson; Lincoln; Washington. *Nebraska.* Buffalo; Lancaster; Saline. *Kansas.* Douglas; Greenwood; Jefferson; Kingman; Meade; Montgomery; Rooks; Washington. *Oklahoma.* Comanche; Grady; Harmon; Pawnee. *Texas.* Austin; Bexar; Bowie; Brazos; Burleson; Burnet; Cameron; Cherokee; Dallas; Harris; Hays; Hidalgo; Hudspeth; Jasper; Jim Wells;



Map 3

Lamar; Liberty; Llano; McLennan; Mills; Navarro; Newton; Panola; San Patricio; Shelby; Somervell; Taylor; Travis; Uvalde; Wichita; Williamson; Wise. *Arizona*. Cochise; Maricopa; Yuma. *Oregon*. Benton; Douglas; Jackson; Yamhill. *California*. Humboldt; Imperial; Kern; Lake; Los Angeles; Marin; Mendocino; Monterey; Riverside; San Diego; San Francisco; San Joaquin; Santa Barbara; Santa Clara; Shasta; Stanislaus; Ventura.

MEXICO. *Nuevo Leon*: 32 mi. SW of Laredo.

OXYOPES SCALARIS Hentz

Figures 87-90, 97-99, 106, 107. Map 4.

- Oxyopes scalaris* Hentz, 1845, Boston Jour. Nat. Hist., 5:196, pl. 17, fig. 4, ♀. Female syntypes from North Carolina, lost; *ibid.*, 1875, Occ. Pap. Boston Soc. Nat. Hist., 2:47, pl. 7, fig. 4, pl. 19, fig. 120, ♀. Emerton, 1885, Trans. Conn. Acad. Arts Sci., 6:502, pl. 49, fig. 11, ♀, Comstock, 1912, The Spider Book, p. 660; *op. cit.*, rev. ed., 1940, p. 668. Chamberlin, 1929, Ent. News, 40:18, fig. 6, ♀. Kaston, 1948, Bull. Connecticut State Geol. Nat. Hist. Surv., 70:340, pl. 59, fig. 1149, ♀.
- Oxyopes laminatus* Tullgren, 1901, Bih. Svensk. Vet. Ak. Handl., 27 (4, 1):24, pl. 1, fig. 14, ♀. Female holotype from Orange Co., Florida, in Zoologiska Inst., Uppsala.
- Oxyopes cinerea* Banks, 1893, Jour. New York Ent. Soc., 1:133. Syntypes from New Hampshire in American Museum of Natural History, examined. NEW SYNONYMY.
- Oxyopes rufipes* Banks, 1893, Jour. New York Ent. Soc., 1:133. Syntypes (♂:6♀) from Olympia, Thurston Co., Washington, in Museum of Comparative Zoology, examined. NEW SYNONYMY.
- Oxyopes compacta* Banks, 1896, Trans. Amer. Ent. Soc., 23:72. Syntypes (300) from Fort Collins, Larimer Co., Colorado, in Museum of Comparative Zoology, examined. NEW SYNONYMY.
- Oxyopes pictipes* Banks, 1901, Proc. Acad. Nat. Sci. Philadelphia, 53:587. Female holotype from Albuquerque, Bernalillo Co., New Mexico in Museum of Comparative Zoology, examined. NEW SYNONYMY.
- Oxyopes classicus* Chamberlin, 1925, Proc. Calif. Acad. Sci., 14(4):126, fig. 38, ♀. Female holotype from Altoona, Lake Co., Florida, in Museum of Comparative Zoology, examined. NEW SYNONYMY.
- Oxyopes tanneri* Chamberlin, 1928, Canad. Ent., 60(4):95. Female holotype from the La Sal Mtns., Utah, in the collection of R. V. Chamberlin, Univ. of Utah, misplaced or lost. NEW SYNONYMY.

Discussion. *Oxyopes scalaris* is the most widespread of the lynx spiders considered in this investigation. The shape of the

epigynum varies somewhat among individuals and the color pattern exhibits a great amount of geographical variation. These two facts have produced an abundance of names in the literature for this species. *Oxyopes laminatus* and *O. classicus* were described from Florida, and *O. tanneri* from Utah. Banks (1893) gave two new names to this species, one to specimens from the state of Washington (*O. rufipes*) and another to specimens from New Hampshire (*O. cinerea*). The separation of these two populations was based on whether the cephalic region of the carapace was elevated above the thoracic region, or on a level with it. If large series are examined, this character varies within the same local populations. The name *O. rufipes* has often been applied to western populations of *O. scalaris*, but only a single species is involved. Chamberlin (1923) used the same criterion as Banks to separate *O. scalaris* from *O. rufipes*. In addition, *O. scalaris* was supposed to have a narrower finger (scape) on the epigynum than *O. rufipes*. The width of the scape also varies in specimens from the same locality as much as it does geographically. Gertsch recognized this synonymy in 1949. Banks (1904) synonymized *O. laminatus* Tullgren with *O. scalaris*. *Oxyopes tanneri*, judging by its description and locality, is probably *O. scalaris*.

Structure. Length of 30 females 5.8-9.6 mm, mean 6.9 mm; length of 30 males 4.7-6.1 mm, mean 5.5 mm. Order of leg length I-II-IV-III. For comparison of certain diagnostic measurements of *O. scalaris* with those of other species see Table II and Diagrams 5 and 6.

Color. The coloration of *O. scalaris* varies greatly not only geographically, but within the same general areas, e.g. Arizona, California. The color patterns illustrated in Figures 87-90 represent the mode of the California populations. The pattern itself remains similar throughout the range of *O. scalaris* but the shade and intensity of color varies considerably. A detailed color description is given for California specimens of *O. scalaris* and there follows a series of descriptions of the typical variations found in other parts of the United States.

Female. California. Eye region dark brown to black with scattered white hairs. A stripe of white hairs from center of eye hexagon running between ALE and AME and continuing to lower edge of clypeus where it forms a triangular mark. Faint pale white hairs running diagonally outward from each ALE. Face dark brown with lateral areas paler yellowish brown, pale color continuing down chelicerae. Above combination of colors

often forming two broad vertical dark brown stripes beginning under ALE, widest at AME, continuing to distal ends of chelicerae. Darker stripes on a background of paler yellowish brown.

Carapace dark brown, almost black with thin line of white hairs from eye region to posterior declivity, joined there by white margin around lower edge of carapace.

Dorsum of abdomen with two basal white stripes that encircle the cardiac region and unite posteriorly where they continue to tip of spinnerets. Posterior to cardiac region this broad stripe is heavily clothed with scale-like hairs and much darker gray-brown. Lateral areas of dorsum dark brown, almost black with two white dashes on each side posteriorly. Anteriorly, the lateral areas may have tufts of white hair intermixed with dark brown or black. White color often expanded in the anterior half of abdomen and visible posteriorly when the spatulate hairs are rubbed off. Cardiac region covered by light brown lanceolate mark, outlined by dark brown or black. Venter of abdomen with wide brown median stripe bounded by white on each side. Lateral areas dark brown or black, mottled with clusters of white hair.

Legs brownish yellow with darker brown on distal halves of femora and on retrolateral surfaces of femora I and II. Brown spots on tibiae as well.

Endites brown with distal ends pale yellow. Labium dark brown. Sternum brown with pale yellow spot in center. Coxae pale yellow or cream.

Arizona. Face and chelicerae very light yellow with darker vertical stripes very faintly indicated. Eye region dark brown with black band from each toward center of eye hexagon.

Carapace light orange with paler yellow center and yellow around margins.

Dorsum of abdomen with paired white bars at base. Most of dorsum yellow with posterior half suffused with orange-brown. Paired spots of yellow posteriorly. Margins of dorsum dark brown. Venter with broad median stripe of brown enclosed by brilliant yellow on each side. Spinnerets light brown.

Legs yellow with few scattered darker markings of brown.

Endites pale yellow or cream. Labium brown. Sternum light brown with large central spot of yellow. Coxae cream.

Colorado. Pattern and color very similar to California populations, but with much of body thickly clothed with appressed white hair giving the spider a much lighter appearance.

Maryland. Eye region dark brown, almost black. Face dark brown with lateral areas paler yellowish brown and a pale yellowish triangular mark mid-way along lower edge of clypeus and two pale spots at lateral edges of clypeus. Chelicerae with vertical dark brown stripes bounded by lighter yellow. Vertical stripes not distinguishable on clypeus.

Carapace dark brown with central longitudinal region somewhat lighter, without paler markings on lower margins of cephalothorax.

Dorsum of abdomen with paired basal white stripes enclosing brown lanceolate mark over cardiac region. Stripes united posteriorly, usually thickly covered by brown hairs giving light brown appearance. Lateral regions dark brown or black. Venter of abdomen with wide median stripe, bordered laterally by slightly narrower white stripes. Sides of abdomen dark brown or black with clusters of white hairs. Very similar to California specimens, but with more black hair giving the spider a gray tinge.

Legs yellowish brown with dusky markings on distal halves of femora; the tibiae with proximal central and distal dark bands.

Male. California. Pattern illustrated in Figures 87 and 88. Eye region dark brown, almost black. Faint line of white hairs from center of eye hexagon, running from ALE to AME. Face dark brown with lighter yellow-brown spots at sides of ALE and along lower edge of clypeus. Chelicerae dark brown with lighter yellowish brown in region of boss and on inner surfaces. Palpi dark brown, almost black.

Carapace dark brown with pale brownish yellow stripe from thoracic groove to posterior edge of carapace. Marginal stripes of brownish yellow.

Dorsum of abdomen with broad central pale stripe from base to spinnerets, forming white margin around brown lanceolate mark of cardiac region. Central stripe covered with dusky scales posteriorly. Thick clothing of translucent scales not producing the iridescent sheen found in *O. salticus*, however. Two white bars on posterior half of abdomen. Lateral regions of dorsum dark brown, almost black. Venter with wide light brown to brown median stripe running length of venter, bordered by stripes of brownish yellow. Lateral regions dark brown with streaks of brownish yellow.

Legs yellowish brown with dusky streaks particularly on

femora I and II, streaks not forming any distinct stripe as in *O. salticus*.

Labium brown. Endites yellowish brown with clothing of dusky hair. Sternum brown with pale spot in middle. Coxae cream to yellow.

Arizona. Eye region black with some iridescence. Face dark brown, reticulate with black. Lighter mark on lower edge of clypeus, rather obscure. Palpi dark brown.

Dorsum of abdomen dark brown almost black with dark reddish brown ill-defined spots. Venter with only thin pale lines bordering median stripe.

Legs with dusky bands, particularly on tibiae and metatarsi. Distal half of femora dusky as well.

Michigan. Much lighter in color than California specimens. Face orange-brown with darker reticulations. Eye region dark orange-brown. Palpi dark brown.

Carapace light orange-brown with central area around thoracic groove yellow-orange.

Dorsum of abdomen without definite pattern. A pair of yellow spots is sometimes present on posterior half. Central area of dorsum light orange-brown from thick clothing of dark orange-brown hairs over lighter background. Sides darker brown. Venter with broad median stripe of dark orange-brown bordered by pale yellow area, finely mottled with orange-brown. Sides darker orange-brown.

Legs yellow without dusky markings or only faint traces of darker color.

Labium dark brown. Endites orange-brown with inner tips at distal ends yellow. Sternum dark orange-brown with central elongate yellow spot.

New York. Eye region black. Face gray-brown without black reticulations. Three faint lighter spots along lower edge of clypeus. Palpi brown tinged with gray.

Carapace gray-brown with lighter area posterior to thoracic groove, somewhat lighter around lower margin of carapace.

Dorsum of abdomen with two pale yellow bars near base. Central region mottled cream and brown, tinged with gray. Lateral areas dark brown or black. Two white dashes on each side posteriorly. Venter similar to California specimens.

Legs yellow but appearing darker due to gray pubescence. No definite bands or stripes.

Sternum brown with pale central spot. Coxae cream.

In general the specimens from California, Washington and Oregon are dark brown, almost black, varying to a russet brown with contrasting white or cream markings as in Figures 87-90. In Colorado this species appears somewhat lighter from a heavy clothing of white appressed hair. Populations in Wisconsin and Michigan are much lighter than the western specimens on the average. Along the eastern seaboard the color pattern again becomes very dark and the specimens resemble the darker ones from California, but never have a russet appearance; instead, they have gray overtones produced by black hairs and the face and carapace are very dark gray-brown without lighter markings. In Arizona are found very light colored individuals (see female above) and dark individuals (see male above). The variations in color of the Arizona and West Coast populations may be a result of altitudinal differences. Not enough information is available at present to determine whether this is true. There are no definite clinal changes in color, nor is it possible to correlate color with a particular habitat at this point.

Diagnosis. *Oxyopes scalaris* is unlike any other North American species of Oxyopidae. The scape of the epigynum is a forwardly directed process as in *O. salticus* (compare Figs. 91-96 with Figs. 97-99), but otherwise these two species bear little resemblance to one another (compare Figs. 80-86 with Figs. 87-90).

Oxyopes scalaris is most similar to *O. ramosus* of northern Europe and somewhat similar to *O. heterophthalmus* of southern Europe among the species with which I am familiar. Since *O. heterophthalmus* is the type-species of the genus *Oxyopes*, the palpus and epigynum have been figured. The male palpus of *O. heterophthalmus* in retrolateral view (Fig. 101) does not bear any resemblance to that of *O. scalaris*, but the ventral aspect is similar in appearance. The retrolateral view of *O. heterophthalmus* was drawn because the huge tibial apophysis is the trademark, so to speak, of this species. The female epigynum of *O. heterophthalmus* (Fig. 100) is basically similar to that of *O. scalaris*, but the two are obviously distinct species. *Oxyopes scalaris*, *O. ramosus*, and *O. heterophthalmus* should certainly be considered as belonging to the same species group or subgenus. The distribution of these three species allows one to formulate some interesting zoogeographic theories.

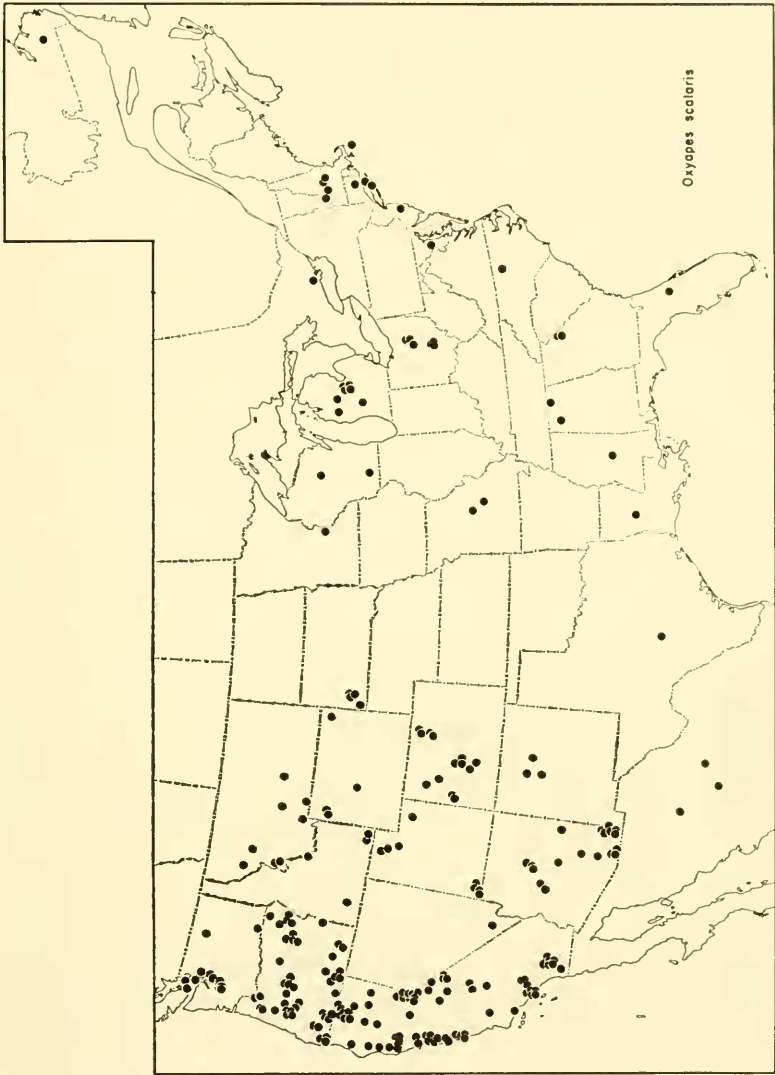
Natural history. *Oxyopes scalaris* is very common throughout the West on sagebrush (*Artemisia*) and similar shrubs. This

lynx spider has been collected in the following types of plant associations in California: Pinyon Pine-Juniper Woodland, Montane Forest, Climax Chaparral, Northern Juniper Woodland, Northern Oak Woodland, Juniper Woodland, Coastal Oak Woodland and Sagebrush Scrub. Thus, it does not appear to be restricted to any particular habitat and occurs over a wide range of elevations. In the East, where it is less common, this species has been collected from pine trees, deciduous trees and shrubs, and by sweeping herbaceous vegetation. Habitat-wise *O. scalaris* seems to be widely adaptable; however, in particular parts of its range this lynx spider seems more restricted in its habitat. It is very possible that the habitat preferences change during the life cycle of the spider.

A single egg case collected in Arizona contained 45 embryos. As in the case of *O. salticus*, the egg cases of *O. scalaris* are very seldom collected.

Distribution. From Canada to northern Mexico and from east coast to west coast.

Records. *Labrador.* 4 ♀ ♀ (H. W. Britcher). *British Columbia.* Victoria, 3 ♀ ♀ (G. W. Peckham). *Ontario.* Hasting Co.: Frankford, collected 20 Oct. 1961, matured 27 Nov.-5 Dec. 1961, ♂ ♂ :3 ♀ ♀ (C. D. Dondale). *Vermont.* Windham. *New Hampshire.* Cheshire; Hillsboro. *Massachusetts.* Nantucket. *Connecticut.* Tolland. *New York.* Suffolk. *New Jersey.* Ocean. *Ohio.* Ashland; Hocking; Wayne. *Maryland.* Prince Georges. *North Carolina.* Durham. *Georgia.* Thompson's Mills, ♂ :11 ♀ ♀ (NB). *Florida.* Lake Co.: Altoona, ♀. *Alabama.* Lawrence; Madison. *Mississippi.* Scott. *Louisiana.* Grant. *Michigan.* Clare; Ionia; Lake; Midland. *Wisconsin.* Dane; Marathon. *Minnesota.* Hennepin. *Missouri.* Cole; Phelps. *South Dakota.* Custer; Fall River. *Texas.* Llano. *Montana.* Carbon; Gallatin; Meagher; Missoula; Musselshell; Ravalli; Sanders. *Idaho.* Bear Lake; Franklin; Lemhi; Owyhee. *Wyoming.* Crook; Fremont; Teton. *Colorado.* Boulder; Garfield; Gunnison; Larimer; Mesa; Rio Blanco; Saguache. *Utah.* Duchesne; Salt Lake; Washington; Weber. *New Mexico.* Bernalillo; Sandoval; San Miguel. *Arizona.* Apache; Cochise; Coconino; Gila; Graham; Pima; Santa Cruz; Yavapai. *Nevada.* Clark. *Washington.* King; Okanagon; Pierce; San Juan; Snohomish; Thurston; Walla Walla. *Oregon.* Baker; Benton; Clackamas; Crook; Deschutes; Douglas; Grant; Harney; Jackson; Josephine; Klamath; Lake; Lane; Malheur; Multnomah; Union; Wallowa; Wheeler; Yamhill. *California.*



Map 4

TABLE II. Measurements of *Oxyopes*

| Species | N | Anterior Lateral Eyes | Posterior Median Eyes | Posterior Lateral Eyes | Carapace Width | Carapace Length |
|-------------------------------|----|--------------------------|--------------------------|---------------------------|-------------------|--------------------|
| <i>S</i> <i>aclelistus</i> | 7 | .648 (.63-.68) | .632 (.61-.66) | 1.164 (1.11-1.24) | 1.69 (1.6-1.9) | 2.29 (2.1-2.5) |
| <i>aureus</i> | 30 | .674±.007(.60-.75) | .662±.007(.60-.75) | 1.218±.012(1.10-1.40) | 1.84±.03(1.6-2.2) | 2.51±.04(2.1-2.9) |
| <i>aglossus</i> | 30 | .599±.004(.56-.64) | .587±.004(.55-.64) | 1.078±.008(1.01-1.18) | 1.69±.01(1.5-1.8) | 2.24±.02(2.0-2.6) |
| <i>occidens</i> | 10 | .789±.015(.72-.88) | .766±.015(.71-.85) | 1.418±.029(1.29-1.60) | 2.16±.07(1.9-2.5) | 2.99±.08(2.6-3.4) |
| <i>apollo</i> | 30 | .540±.007(.46-.59) | .541±.007(.46-.59) | 1.002±.012(0.86-1.13) | 1.64±.03(1.3-1.9) | 2.15±.03(1.7-2.4) |
| <i>floridanus</i> | 8 | .527±.013(.49-.59) | .530±.013(.49-.59) | .989±.024(0.91-1.10) | 1.61±.03(1.5-1.8) | 2.12±.06(1.9-2.4) |
| <i>tridens</i> | 26 | .659±.006(.60-.71) | .644±.005(.59-.70) | 1.181±.009(1.09-1.25) | 1.90±.02(1.6-2.1) | 2.53±.02(2.2-2.7) |
| <i>salticus</i> | 30 | .539±.006(.49-.60) | .543±.006(.50-.60) | .990±.010(0.89-1.09) | 1.78±.03(1.5-2.0) | 2.37±.04(2.0-2.8) |
| <i>scalaris</i> | 30 | .626±.007(.55-.71) | .623±.007(.54-.71) | 1.121±.013(0.98-1.28) | 2.10±.03(1.8-2.6) | 2.74±.04(2.3-3.4) |
| <i>aclelistus</i> | 9 | .601±.012(.54-.64) | .585±.012(.53-.63) | 1.075±.022(0.96-1.15) | 1.63±.05(1.4-1.8) | 2.13±.04(1.9-2.3) |
| <i>aureus</i> | 28 | .613±.005(.56-.66) | .600±.005(.54-.64) | 1.095±.009(1.00-1.21) | 1.68±.03(1.4-2.0) | 2.21±.02(2.0-2.5) |
| <i>aglossus</i> | 27 | .573±.004(.54-.60) | .558±.004(.51-.59) | 1.020±.007(0.95-1.08) | 1.66±.02(1.5-1.8) | 2.15±.02(1.9-2.3) |
| <i>occidens</i> | 5 | .715 (.68-.75) | .693 (.65-.73) | 1.265 (1.20-1.31) | 1.99 (1.9-2.1) | 2.54 (2.4-2.6) |
| <i>apollo</i> | 30 | .468±.005(.43-.53) | .468±.005(.43-.53) | .858±.009(.78-.96) | 1.39±.01(1.3-1.5) | 1.81±.03(1.6-2.1) |
| <i>floridanus</i> | 2 | .49 | .48 | .88 | 1.3 | 1.8 |
| | | .46 | .46 | .85 | 1.4 | 1.9 |
| <i>tridens</i> | 25 | .650±.006(.60-.73) | .631±.005(.59-.66) | 1.158±.010(1.08-1.28) | 1.87±.02(1.6-2.0) | 2.41±.02(2.2-2.7) |
| <i>A</i> <i>pardus</i> | 2 | .63 | .61 | 1.11 | 1.8 | 2.2 |
| | | .60 | .59 | 1.05 | 1.9 | 2.4 |
| <i>M</i> <i>felinus</i> | 1 | .59 | .56 | 1.01 | 1.6 | 2.1 |
| <i>lynx</i> | 1 | .58 | .55 | 1.03 | 1.7 | 2.3 |
| <i>salticus</i> | 30 | .510±.004(.46-.55) | .510±.005(.46-.56) | .930±.009(0.84-1.00) | 1.77±.03(1.4-2.1) | 2.25±.04(1.9-2.7) |
| <i>scalaris</i> | 30 | .585±.006(.53-.68) | .574±.006(.51-.66) | 1.030±.010(0.95-1.21) | 2.04±.03(1.8-2.4) | 2.53±.04(2.2-3.1) |

TABLE II. Measurements of *Oryopes* (continued)

| Species | N | Total Length I | Patella-Tibia I | Patella-Tibia II | Patella-Tibia III | Patella-Tibia IV |
|------------|----|---------------------|-------------------|---------------------|-------------------|-------------------|
| S | | | | | | |
| acleistus | 6 | 8.35 (7.2-8.9) | 2.81 (2.4-3.0) | 2.62 (2.5-2.8) | 1.88 (1.4-2.0) | 2.22 (1.8-2.4) |
| aureus | 30 | 9.03±.15(7.5-10.6) | 3.05±.05(2.5-3.5) | 2.77±.05(2.3-3.4) | 2.07±.04(1.6-2.4) | 2.47±.04(2.0-2.9) |
| F | | | | | | |
| aglossus | 30 | 8.09±.10(7.2-9.6) | 2.74±.04(2.4-3.3) | 2.50±.03(2.2-3.0) | 1.92±.08(1.6-2.3) | 2.21±.03(1.9-2.5) |
| L | | | | | | |
| occidens | 10 | 10.27±.29(9.8-12.5) | 3.70±.10(3.3-4.4) | 3.36±.10(3.0-4.0) | 2.57±.08(2.3-3.0) | 3.04±.08(2.8-3.5) |
| A | | | | | | |
| apollo | 30 | 6.58±.12(5.2-8.0) | 2.11±.04(1.6-2.6) | 2.00±.04(1.6-2.4) | 1.50±.03(1.2-1.8) | 2.26±.05(1.9-2.9) |
| M | | | | | | |
| floridanus | 8 | 6.60±.21(5.9-7.6) | 2.09±.07(1.9-2.4) | 2.06±.07(1.7-2.4) | 1.46±.05(1.2-1.7) | 2.29±.08(2.0-2.7) |
| F | | | | | | |
| tridens | 25 | 8.87±.09(8.0-10.0)* | 2.87±.03(2.6-3.2) | 2.63±.03(2.3-2.9) | 1.90±.03(1.6-2.2) | 2.88±.04(2.5-3.3) |
| L | | | | | | |
| saliticus | 30 | 9.03±.20(6.9-10.9) | 3.10±.07(2.4-3.9) | 2.85±.07(2.1-3.6) | 2.23±.05(1.7-2.8) | 2.62±.06(2.0-3.3) |
| L | | | | | | |
| scalaris | 30 | 9.47±.14(7.8-11.9) | 3.25±.05(2.7-3.6) | 3.02±.05(2.5-3.9) | 2.45±.04(1.9-3.1) | 2.68±.04(2.2-3.4) |
| | | | | | | |
| acleistus | 8 | 8.81±.20(8.1-9.9) | 2.86±.06(2.6-3.2) | 2.43±.13(2.4-3.0) | 1.83±.04(1.6-2.0) | 2.11±.06(1.8-2.4) |
| aureus | 27 | 8.89±.14(7.6-10.3) | 2.89±.05(2.4-3.4) | 2.56±.04(2.1-3.0)** | 1.82±.03(1.6-2.1) | 2.16±.04(1.8-2.6) |
| aglossus | 27 | 8.41±.09(7.6-9.1)* | 2.77±.03(2.5-3.0) | 2.44±.02(2.1-2.7)* | 1.81±.02(1.6-2.0) | 2.06±.02(1.8-2.3) |
| S | | | | | | |
| occidens | 5 | 10.22 (9.9-10.8) | 3.32 (3.2-3.5) | 2.99 (2.9-3.1) | 2.25 (2.1-2.4) | 2.59 (2.5-2.8) |
| F | | | | | | |
| apollo | 30 | 6.37±.07(5.7-7.1) | 1.97±.02(1.8-2.2) | 1.85±.02(1.6-2.1) | 1.36±.02(1.1-1.5) | 1.99±.03(1.8-2.4) |
| F | | | | | | |
| floridanus | 2 | 6.4 | 2.0 | 1.9 | 1.4 | 2.0 |
| L | | | | | | |
| tridens | 24 | 9.51±.09(8.8-10.2) | 3.03±.03(2.8-3.3) | 2.74±.03(2.5-3.0) | 1.96±.03(1.7-2.1) | 2.80±.03(2.4-3.0) |
| A | | | | | | |
| pardus | 2 | 8.3 | 2.7 | 2.6 | 2.0 | 2.6 |
| M | | | | | | |
| fellnus | 1 | 7.4 | 2.4 | 2.2 | 1.6 | 2.3 |
| L | | | | | | |
| lynx | 1 | 8.4 | 2.7 | 2.4 | 1.7 | 2.6 |
| S | | | | | | |
| saliticus | 30 | 8.86±.20(7.1-11.0) | 2.85±.06(2.3-3.6) | 2.59±.06(2.1-3.3) | 2.04±.05(1.6-2.6) | 2.34±.05(1.8-3.0) |
| L | | | | | | |
| scalaris | 30 | 9.99±.16(8.2-12.8) | 3.33±.06(2.7-4.4) | 3.00±.05(2.4-3.9) | 2.36±.04(1.9-3.0) | 2.57±.04(2.0-3.3) |

*N=24, **N=25, ★N=26. N equals the number of specimens in each sample. All measurements are in millimeters with the mean and standard error calculated where eight or more specimens were available. The range of the sample is given in parentheses.

Almeda; Alpine; Eldorado; Humboldt; Kern; Lake; Lassen; Los Angeles; Madera; Marin; Mariposa; Mendocino; Mono; Monterey; Napa; Placer; Plumas; Riverside; San Diego; San Francisco; San Luis Obispo; San Mateo; Santa Barbara; Santa Clara; Santa Cruz; Shasta; Sierra; Siskiyou; Tehama; Tulare; Tuolumne.

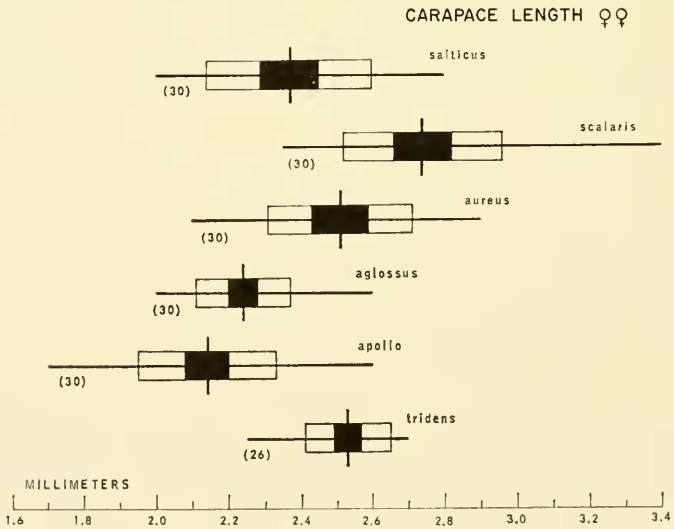
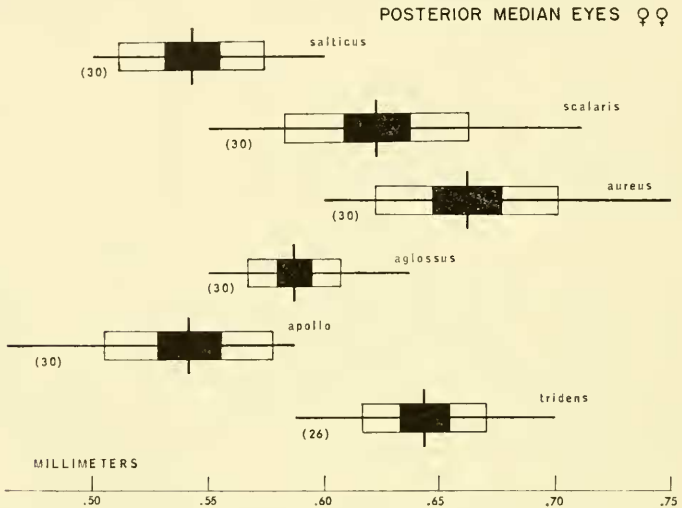


Diagram 5 — Measurements of *Oxyopes*.
For interpretation refer to Diagram 3.

MEXICO. *Chihuahua*. 25 mi. W of Camargo, 13 July 1947, ♂ (WJG); Huejotitlan, 20 July 1947, ♀ (WJG). Matachie, 6 July 1947, ♀ (WJG).

PATELLA-TIBIA I & IV

♀♀

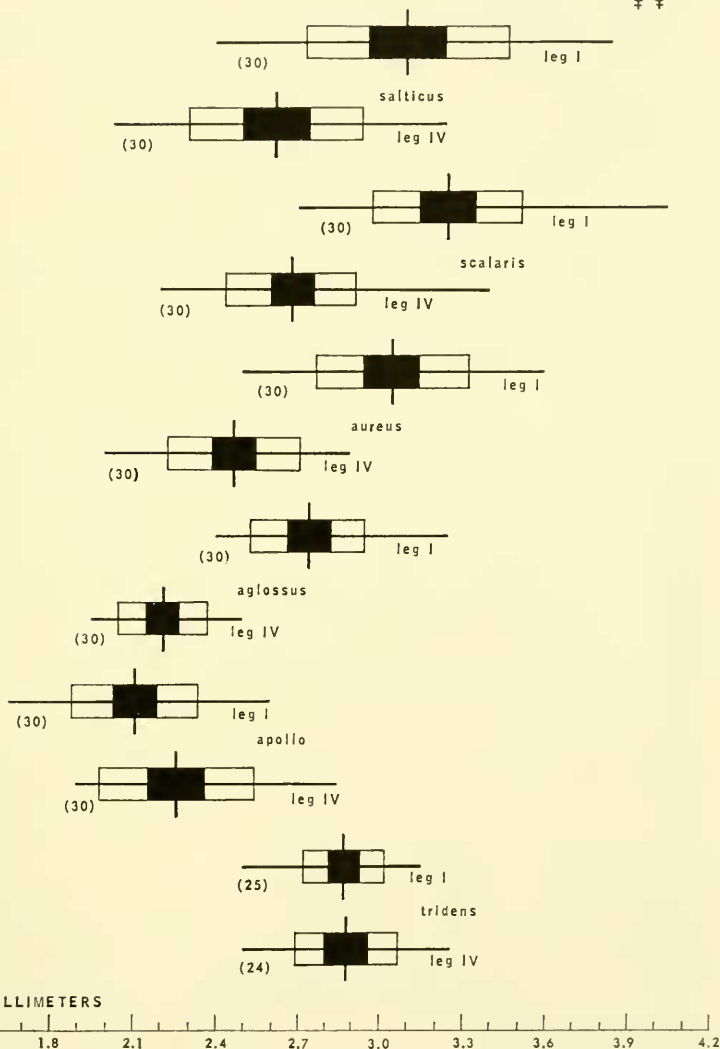


Diagram 6 — Measurements of *Oxyopes*.
For interpretation refer to Diagram 3.

HAMATALIWA Keyserling

Hamataliwa Keyserling, 1887, Verh. Zool.-Bot. Ges. Wien, 6:458, fig. 24, ♀.

Type species by monotypy: *Hamataliwa grisea* Keyserling, *op. cit.*, 6:458, fig. 24, ♀, from North America in British Museum (Natural History), examined.

Oxyopeidon O.P.-Cambridge, 1894, Biologia Centrali-Americana, Arachnida, 1:139. Type species designated by F. O. P.-Cambridge, 1902, Biologia Centrali-Americana, Arachnida, 2:346: *Oxyopeidon putum* O. P.-Cambridge, 1894, *op. cit.*, 1:140, in British Museum (Natural History), examined.

Characteristics. Eyes: AME smallest; PME and PLE subequal in size, larger than AME but slightly smaller than ALE. ALE largest.

Width of eye rows variable (Table III). AME row much the smallest, below or in line with the ALE. ALE row wider than PME row (*H. helia*) or PME row much wider than ALE row (*H. grisea*, *H. unca*). PLE row much the widest. The eyes of *Hamataliwa* generally occupy a much greater comparative space than do the eyes of *Oxyopes* or *Peucetia* (compare Table II with Table III).

Cephalothorax very high and convex, sometimes rectangular in appearance. The vertical slope of the face, however, is much more gradual in *H. grisea* and *H. unca* than in *Oxyopes* or *Peucetia*. Sides of cephalothorax vertical. Carapace often clothed with long hair, and with tufts of hair in eye region.

Labium longer than wide. Endites exceeding the length of labium and converging in front of it.

Abdomen oblong-oval, sometimes quite broad and truncate near the base, more ovate than in *Oxyopes* and *Peucetia*. Long hairs often along sides of abdomen.

Order of leg length I-II-III-IV. The first pair of legs very long and robust. The third pair of legs subequal to or larger than the fourth pair. Fourth pair of legs comparatively weakly developed, unlike *Oxyopes* or *Peucetia*. Legs often with long fringes of hair on the lateral surfaces.

Coloration is cryptic and includes various shades of gray, brown and yellow, with intermixtures of black and white hairs. Together with the rich clothing of long hairs on the legs and body, the color patterns provide excellent concealment against the bark of trees, twigs or woody shrubs. Most species are apparently arboreal.

Female epigyna of similar design throughout the genus, consisting of a shallow median depression enclosed by a circular or

horseshoe-shaped, heavily sclerotized posterior rim (Figs. 115-120). Male palpi also similar in basic construction, with the embolus forming a characteristic twisted loop near the base at the mesal edge of the cymbium (Figs. 128-135).

Hamataliwa is easily recognized by the general form of the body, coloration, relative length of the legs, and, above all, by the structure of the genitalia. The arrangement of the eyes is not a valid criterion for separating genera.

HAMATALIWA HELIA (Chamberlin), new combination

Figures 112-114, 119-121, 124, 125, 130-133. Map 5.

Oxyopes helius Chamberlin, 1929, Ent. News, 40:19, fig. 4, ♀. Female holotype from Mixson's Hammock, Okefenokee Swamp, Georgia, in the American Museum of Natural History, examined.

Discussion. Bryant (1936) described what she considered to be the male of *H. helia* (Chamberlin) from Kaufman, Texas. This male is actually a new species, *Oxyopes apollo*.

Structure. Length of 24 females 3.7-5.5 mm, mean 4.6 mm; length of five males 3.2-3.7 mm, mean 3.5 mm. Order of leg length I-II-III-IV. For comparison of *H. helia* with other species see Table III.

Color. Female. Patterns illustrated in Figures 112-114. Eyes outlined with black, with black bands continuing toward center of eye group. Face pale brownish yellow to yellow-orange. Russet spatulate hairs covering much of the clypeus and chelicerae, contributing orange color over yellowish integument. Stripe of white appressed hairs from center of eye hexagon to AME, broader white stripe along sides of face between ALE and PLE to condyle of chelicerae. Tufts of white hair in eye region.

Carapace light brownish yellow to yellow-orange (Fig. 113), sometimes almost white due to dense clothing of flattened white hair (Fig. 114). Sides of carapace darker brown with clothing of dark brown spatulate hairs. Thoracic groove brown.

Dorsum of abdomen pale cream to white with lateral areas darker orange brown (Fig. 113). Sometimes the entire dorsum is white (Fig. 114). Venter of abdomen pale yellow with darker russet color in lateral regions.

Legs yellow to brownish yellow with dusky markings at distal regions of femora and proximal regions of tibiae.

Endites and labium pale yellow, yellow-orange or brownish yellow with distal ends usually lighter. Sternum pale yellow.

Male. Pattern illustrated in Figures 124 and 125. Eyes circled in black with black bands continuing toward center of hexagon. Face brownish yellow to brown with dark gray reticulations, often coalescing to form a gray band at lower edge of clypeus. Tuft of iridescent scale-like hairs between ALE. Cymbium and tibia of palpus dark brown or black. Chelicerae brownish yellow to brown with subdistal white band.

Carapace glabrous, brownish yellow to brown. Darker along sides and to rear of thoracic region where spatulate hairs are present. Scattered iridescent scales on dorsum. Venter of abdomen dark brown or black with central area darkest. Iridescent spatulate scales present. Lung book covers yellow.

Legs pale yellow to brownish yellow with irregular dusky markings and scattered iridescent scales on femora, most conspicuous on prolateral surfaces.

Endites pale yellow to brownish yellow with darker distal border. Labium brownish yellow to brown. Sternum yellow to yellowish brown.

Diagnosis. *Hamataliwa helia* was described in the genus *Oxyopes* by Chamberlin (1929), probably on the basis of the eye arrangement. The structure of the genitalia, relative length of the legs, general body structure and coloration indicate that *H. helia* properly belongs in the genus *Hamataliwa*. *Hamataliwa helia* is more like *H. grisea* and *H. unca* than any of the species of *Oxyopes*, especially in the characters noted above. As previously mentioned there are a number of species in Mexico, Central America, the West Indies and in other parts of the world that have been placed in the genus *Oxyopes*, but whose true affinities lie with those lynx spiders comprising the genus *Hamataliwa*.

Hamataliwa helia is much smaller than the other two species of *Hamataliwa* occurring in the United States and is separable on this basis alone. The largest male of *H. helia* is 3.7 mm, the largest female 5.5 mm. The smallest male of *H. grisea* is 4.7 mm, the smallest female 6.2 mm. There are also distinct differences in the eye arrangement of *H. helia* and that of *H. grisea* and *H. unca* (Table III). These three species can also be easily separated on the basis of genitalia, especially in the males (compare Figs. 130-133 with Figs. 128, 129 and Figs. 134, 135).

Natural history. *Hamataliwa helia* was collected at night from the lower branches of trees at Torreya State Park, Florida, on June 23. At this time most of the females had egg cases. The egg cases were suspended from the tree branches by stout

guy-lines and the females, in every case, were tightly gripping the underside of the egg case. In this position, they blend in with the egg cases. The egg cases are somewhat ovoid, but with a definite triangular form and many tiny tufts or teat-like projections. They measure about 5 mm across and examination of two egg sacs disclosed 34 embryos in one and 48 spiderlings in the other. The embryos are about 0.8 mm in diameter.

There were two distinctly different color phases of female in this species, one light brownish yellow or russet (Fig. 113) and the other form completely white above (Fig. 114). A single male was collected at this same locality. As in other species of the genus, *H. helia* seems to be arboreal and is colored to blend in with the twigs or branches of trees. This spider is much more hirsute than any North American species of *Oxyopes*, the hairiness helping to break up the outline of the body against tree bark.

Distribution. Florida to Texas and south to Yucatan (Map 5).

Records. *Georgia.* Mixson's Hammock, Okefenokee Swamp, 16 June 1912, ♀ (CRC). *Florida.* Alachua Co.: Gainesville, Live Oak Hammock, 23 July 1942, ♀. Liberty Co.: Torreya St. Pk., 22 June 1962, ♀ (JAB), 23 June 1962, ♂:10 ♀♀ (ARB, JAB). *Alabama.* Baldwin Co.: Lagoon, 24 Apr. 1951, ♂ (AFA); Bear Foot, 6 June 1957, ♀. Wilkinson Co.: Centerville, Jan.-July 1944, ♀ (AFA). *Texas.* Cameron Co.: Brownsville, ♀ (C. Schaeffer), 8 June 1934, ♀♀ (JNK). Hidalgo Co.: Edinburg, 1934, ♀♀ (SM). Jasper Co.: Jasper, 6 June 1936, ♂ (SM).

MEXICO. *Nayarit.* Jesus Maria, 22-30 June 1955, ♂♂; La Mesa de Nayarit, 16-21 July 1955, ♀ (BM). *Jalisco.* W side of Lake Sayula, 3 Aug. 1956, ♀ (WJG, VDR). *Oaxaca.* Oaxaca, 4 July 1955, ♀ (CV, PV). *Chiapas.* Ocosingo, 23 June 1950, ♀ (CG, MG). *Yucatan.* Chuminopolis, 15 Aug. 1952, ♂ (JCP, DLP); Uxmal, 16-18 June 1959, ♂ (CV, PV).

HAMATALIWA UNCA sp. n.

Figures 110, 111, 117, 118, 122, 123, 128, 129. Map 5.

Holotype. Male from Edinburg, Hidalgo Co., Texas, Sept.-Dec. 1933 (S. Mulaik) in American Museum of Natural History. The specific name is an arbitrary combination of letters.

Discussion. The male and females considered under this name were not collected together and, therefore, may represent two

distinct species. Since the specimens were collected in the same region (southern Texas) and because the sexes agree in eye arrangement, general body form, size and coloration, I have considered them as one species.

Structure. Length of three females 5.9, 6.2 and 7.4 mm; length of male holotype 5.1 mm. Order of leg length I-II-III-IV. For comparison of *H. unca* with other species see Table III.

Color. Female. Pattern illustrated in Figures 110 and 111. Eyes with black bands extending toward center of hexagon; eye region thickly clothed with white hairs, sometimes hiding black bands. Face yellow or yellow-orange to yellowish brown, white hair along lateral regions of face.

Carapace pale brownish yellow overlaid with white hair that is especially abundant along vertical sides. Thoracic groove marked with dark brown.

Dorsum of abdomen cream to pale brownish yellow. In one specimen there is a large spot of thick black hair covering the basal half. When hair is rubbed off, chalk white pigment deposited beneath the integument is disclosed. Venter of abdomen with wide median stripe of gray-brown bordered by cream in one specimen, the median stripe indicated by scattered darker hairs in another, and the third specimen without the median stripe.

Legs yellow with fringes of white hair, most conspicuous on the femora and tibiae. Dark brown annuli at proximal, central and distal regions of metatarsi in one specimen, in another these bands are only faintly indicated, and in the third specimen the metatarsi and tarsi are entirely brown. Palpi fringed with long white hair.

Endites pale yellow to yellow-orange with darker brown along lateral margins. Labium darker brown. Sternum pale yellow to yellow-orange with thick clothing of hair.

Male. Pattern illustrated in Figures 122 and 123. Eyes circled in black with black bands proceeding from eyes toward center of hexagon. Few scattered hairs in eye region, but probably more in the living spider. Face light brownish yellow or amber with scattered darker hairs. Cymbium of palpus brown with distal tip pale.

Carapace glabrous. Pale brownish yellow or amber with sides dark brown or chocolate due to fine points of black pigmentation.

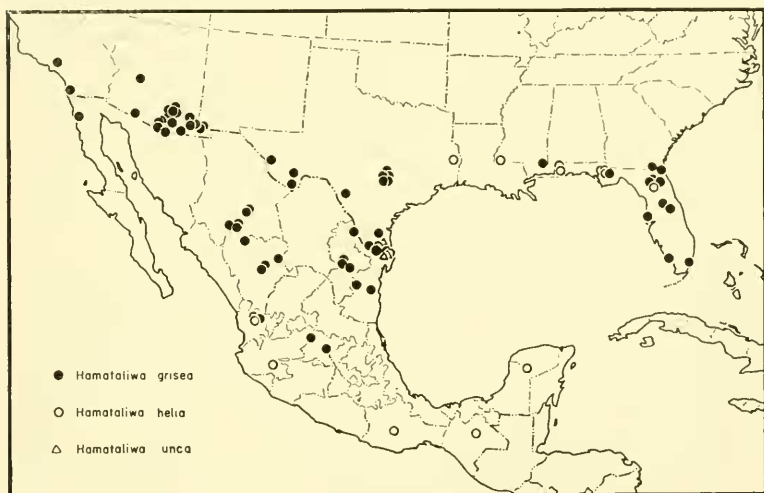
Dorsum of abdomen cream, thickly clothed with white hair. Venter of abdomen darker, pale yellowish brown with no indications of a median stripe.

Legs yellow. Metatarsi with distal, central and proximal dark bands; other segments without darker markings.

Endites yellow. Labium suffused with darker brown. Sternum yellow.

Distribution. Southern Texas (Map 5).

Records. Texas. Cameron Co.: 10 mi. W of Boca Chica, 29 Oct. 1951. ♀ (W. S. Creighton); Brownsville, 8 June 1934, ♀ (JNK); Rangerville, 15 Sept. 1935; ♀ (M. Welch, K. Lamb). Hidalgo Co.: Edinburg, Sept.-Dec. 1933, ♂ (SM).



Map 5

HAMATALIWA GRISEA Keyserling

Figures 108, 109, 115, 116, 126, 127, 134, 135. Map 5.

Hamataliwa grisea Keyserling, 1887, Verh. Zool.-Bot. Ges. Wien, 37:458, pl. 6, fig. 24, ♀. Female holotype from North America, in the British Museum (Natural History), examined.

Hamataliwa grisea: Simon, 1898, Histoire naturelle des Araignées, 2(2):375, 377, 378, 380, figs. 373, 379. Comstock, The Spider Book, 1912, p. 660; *op. cit.*, rev. ed., 1940, p. 668.

Discussion. Banks (1903), Lutz (1915), and Franganillo (1936) have reported this species from the West Indies. I have not seen any specimens in the large collections available from these islands and assume that these early records are of a similar,

but distinct species of which there are several in the West Indies.

Color. Female. Pattern illustrated in Figures 108 and 109. Eyes with black bands extending toward center of eye hexagon. Eye region orange-brown, often thickly clothed with white and black appressed hairs. Face russet, orange-brown or very dark orange-brown, depending on the amount and composition of the hair covering the face. Usually there is a fine clothing of white and black hair intermixed. Lateral regions of face darker brown. Lower edge of clypeus often lighter yellow-orange. Margins of chelicerae dark brown, heavily sclerotized.

Carapace orange-brown to dark orange or reddish brown (mahogany). In the female figured there is a diagonal stripe of white hair on each side from the cheliceral condyle upward to the posterior declivity of the thorax. The posterior declivity of the thorax is usually lighter in color and clothed with white hair. The sides below the diagonal white stripes are dark brown, as they are in the great majority of specimens. In addition, the carapace in most specimens is clothed with fine, intermixed, black and white hair. The black hairs are more abundant along the sides of the carapace, hence the darker color.

Dorsum of abdomen dark brown or black, with small intermingled tufts of black and white hair giving it a dull gray appearance. A few specimens have the abdomen much lighter, pale yellowish brown from a dense clothing of white hair with few or no black hairs. Venter cream to pale yellow or tau without a darker median stripe in nearly all the specimens. A few have a darker median area.

The contrasting dark upper surfaces and the much lighter underside is characteristic of this species.

Legs yellow to brownish yellow, sometimes tinged with orange. Usually long fringes of hair present on the lateral surfaces of the patellae-tibiae. Palpi also with long white hair.

Endites pale brownish yellow with distal ends ivory; seopulae black. Labium pale brownish yellow with sides darker. Sternum soft yellow or pale brownish yellow.

Male. Pattern illustrated in Figures 126 and 127. Eyes with black bands extending toward center of hexagon. Eye region dark brown to almost black. Face russet brown, dark orange-brown to dark brown or black. Sometimes with black reticulations visible against a lighter background. Face clothed with scattered white hairs intermixed with black hair, becoming more

abundant laterally. These hairs give a gray overtone. Lower edge of clypeus and ends of chelicerae often lighter yellowish brown. Palpi dark brown or black, with clothing of long black hair and scattered white hairs.

Carapace russet brown, dark orange-brown to dark reddish brown, with clothing of fine black and white hair. Black hair more abundant laterally making sides darker brown or almost black. Thoracic declivity lighter in color, clothed with white, flattened hair. Intermixed fine black and white hairs on carapace often providing a dull gray appearance.

Dorsum of abdomen dark brown overlaid with spots of black and white hair in a salt-and-pepper manner giving it a dull gray appearance. Black hairs sometimes forming irregular bands. Venter of abdomen cream to pale yellowish brown without median stripe.

Legs pale yellowish brown, often with darker orange tinge, and usually lacking the long fringes of hair found in many females. A few specimens have the more distal segments of the legs marked with gray or black bands.

Endites pale yellow or yellowish orange, with ends lighter, ivory. Labium slightly darker with brownish lateral edges. Sternum cream to pale yellow, often suffused with orange.

Diagnosis. *Hamataliwa grisca* is similar to *H. unca* in size and structure of the body. *Hamataliwa grisca* is usually much darker in color than *H. unca* and slightly larger in size. Table III discloses other differences between these two species. The AME of *H. grisca* form a straight line with the ALE at their lower edges (Figs. 108, 122), but in *H. unca* the AME are below the ALE and form a recurved line from in front (Figs. 110, 122). The male and female genitalia of *H. grisca* (Figs. 115, 116, 134, 135) immediately separate it from *H. unca* and from other Neotropical species of *Hamataliwa*.

Natural history. Although *H. grisca* is occasionally collected by sweeping herbaceous vegetation, it is probably a normal inhabitant of trees and woody shrubs. A male was collected by sweeping Compositae at Goose Island State Park, Aransas Co., Texas. Several females have been taken from guy-lines suspended from trees. One of these females was placed in a glass container and observed. A small twig was placed in the jar with her and she immediately took up a position on the twig with her legs drawn in toward the body and the head downward. In this attitude the spider was perfectly camouflaged against the

TABLE III. Measurements of *Hamatibia* and *Puccinia*

| Species | N | Anterior Lateral Eyes | Posterior Median Eyes | Posterior Lateral Eyes | Carapace Width | Carapace Length |
|-----------------------|----|--------------------------|--------------------------|---------------------------|--------------------------|-------------------------|
| <i>H. nella</i> | 24 | .563±.005(.48-.60) | .491±.007(.38-.54) | .961±.010(0.83-1.02) | 1.65±.01(1.4-1.8) | 2.03±.03(1.6-2.2) |
| | | 1.05 | 1.35 | 1.84 | 2.0 | 2.4 |
| <i>H. unca</i> | 3 | 1.12 | 1.44 | 1.95 | 2.4 | 2.7 |
| | | 1.05 | 1.37 | 1.87 | 2.1 | 2.6 |
| <i>H. grisea</i> | 30 | 1.128±.017(0.95-1.28) | 1.504±.022(1.30-1.73) | 1.965±.026(1.70-2.23) | 2.46±.04(2.0-2.8) | 2.87±.04(2.3-3.2) |
| <i>P. viridans</i> | 30 | .992±.015(0.83-1.13) | .698±.011(.60-.80) | 1.404±.024(1.18-1.65) | 4.57±.10(3.6-5.8) | 5.92±.12(4.6-7.5) |
| <i>P. longipalpis</i> | 30 | .989±.014(0.83-1.17) | .688±.009(.60-.80) | 1.400±.021(1.18-1.72) | 4.66±.10(3.5-6.0) | 5.95±.12(4.6-7.9) |
| <i>H. nella</i> | 5 | .467 (.45-.49) | .410 (.38-.44) | .798 (.73-.84) | 1.30 (1.2-1.4) | 1.67 (1.5-1.8) |
| <i>H. unca</i> | 1 | 1.00 | 1.19 | 1.69 | 1.9 | 2.3 |
| <i>H. grisea</i> | 29 | .905±.012(0.77-1.03) | 1.186±.018(1.00-1.38) | 1.577±.022(1.35-1.77) | 2.10±.03(1.7-2.4) | 2.45±.04(2.0-2.8) |
| <i>P. viridans</i> | 30 | .792±.011(0.72-0.97) | .565±.009(.48-.69) | 1.108±.016(0.95-1.33) | 3.72±.08(2.9-4.9) | 4.56±.09(3.7-5.8) |
| <i>P. longipalpis</i> | 30 | .794±.013(0.63-0.90) | .571±.010(.45-.65) | 1.100±.017(0.83-1.27) | 3.73±.07(2.7-4.5) | 4.60±.10(3.4-5.4) |
| | | <u>Total Length I</u> | <u>Patella-Tibia I</u> | <u>Patella-Tibia II</u> | <u>Patella-Tibia III</u> | <u>Patella-Tibia IV</u> |
| <i>H. nella</i> | 23 | 6.46±.10(5.0-7.1) | 2.26±.04(1.7-2.5) | 2.11±.04(1.6-2.4) | 1.62±.03(1.2-1.8) | 1.52±.03(1.1-1.7) |
| | | 8.3 | 3.1 | 2.9 | 2.1 | 2.0 |
| <i>H. unca</i> | 3 | 9.4 | 3.6 | 3.3 | 2.5 | 2.3 |
| | | 8.7 | 3.4 | 3.0 | 2.3 | 2.2 |
| <i>H. grisea</i> | 30 | 9.77±.13(8.7-10.9) | 3.73±.05(3.0-4.2) | 3.40±.05(2.6-3.9) | 2.51±.05(1.9-2.9) | 2.44±.04(1.9-2.8) |
| <i>P. viridans</i> | 30 | 9.6±.65(22.9-38.7) | 10.51±.23(7.7-13.0) | 9.48±.21(6.7-11.8) | 7.52±.18(5.6-9.6) | 8.15±.19(5.7-10.0) |
| <i>P. longipalpis</i> | 30 | 27.21±.62(20.4-37.0) | 9.25±.21(6.8-12.2) | 8.46±.20(6.1-11.5) | 6.87±.16(5.0-9.2) | 7.35±.16(5.6-9.9) |
| <i>H. nella</i> | 5 | 5.62 (5.3-5.9)* | 1.97 (1.8-2.1)* | 1.87 (1.8-2.0) | 1.41 (1.3-1.6) | 1.26 (1.1-1.4) |
| <i>H. unca</i> | 1 | 9.0 | 3.2 | 3.0 | 2.4 | 2.0 |
| <i>H. grisea</i> | 29 | 9.70±.14(8.4-11.1) | 3.53±.05(3.0-4.0) | 3.20±.05(2.6-3.6) | 2.36±.04(2.0-2.8) | 2.23±.04(1.9-2.6) |
| <i>P. viridans</i> | 30 | 33.67±.67(27.1-42.9) | 10.45±.21(8.4-13.4) | 9.24±.19(7.3-11.9) | 6.99±.16(5.2-9.0) | 7.63±.17(6.1-9.8) |
| <i>P. longipalpis</i> | 30 | 31.20±.73(23.8-40.8) | 9.63±.22(7.3-12.4) | 8.59±.20(6.3-11.0) | 6.66±.16(5.0-8.4) | 7.21±.17(5.2-9.0) |

*N=4. N equals the number of specimens in each sample. All measurements are in millimeters with the mean and standard error calculated where eight or more specimens were available. The range of the sample is between 1.

bark of the small branch, and she remained in this position even when the twig was removed from the container. This lynx spider remained in a quiescent state and if disturbed used a rapid scuttling motion to escape, much as do some thomisids. Jumping was resorted to only when the spider was greatly disturbed and this act was much less frequent than in spiders of the genus *Oxyopes*.

In Arizona this species was observed on Prickly-Pear Cactus (*Opuntia*), but it is probably more abundant and obviously better hidden on the woody shrubs in this area.

Distribution. Across the southern United States from Florida to California and south to Guanajuato and Jalisco (Map 5).

Records. *Georgia.* Okefenokee Swamp, June 1912, ♂. *Florida.* Alachua; Collier; Dade; Lake; Liberty; Nassau; Orange; Pinellas; Putnam. *Mississippi.* George. *Texas.* Aransas; Brewster; Cameron; Hidalgo; Jeff Davis; Jim Wells; Starr; Travis; Uvalde. *New Mexico.* Hidalgo. *Arizona.* Cochise; Maricopa; Pima; Santa Cruz. *California.* Los Angeles; San Diego.

MEXICO. Tamaulipas; Nuevo Leon; Chihuahua; Durango; Baja California; Guanajuato; Jalisco.

PEUCETIA Thorell

Pasithea Blackwall 1858, Ann. Mag. Nat. Hist., 3(1):427. Type species by monotypy: *Pasithea viridis* Blackwall, *op. cit.* (3)1:427 from Algeria (Hope Dept. of Entomology, Oxford Univ.). Not *Pasithea* Oken, 1807, a polychaete worm.

Peucetia Thorell, 1869, On European Spiders, Uppsala, 7:196. New name for *Pasithea* Blackwall preoccupied. Thorell, 1869, also designated *Peucetia viridis* (Blackwall) [= *P. littoralis* Simon] as the type of *Peucetia*. *Peucetia viridis* (Blackwall), 1858, is a junior homonym of *Peucetia viridis* (Walekenaer), 1841 [= *P. viridans* (Hentz)].

Characteristics. Eyes: AME smallest; PME and PLE subequal in size, larger than AME. ALE much the largest. Eye rows: AME row much the smallest; ALE row much larger than PME row. PLE row largest. PME and PLE forming only a slightly procurved row, not so procurved as in *Oxyopes*, or *Hamataliwa* (compare Figs. 137, 142 with Figs. 2, 3, 6 and Figs. 109, 111, 114).

Cephalothorax not so high or convex as that of *Oxyopes* or *Hamataliwa*. Carapace narrow in the cephalic region, broadening considerably posteriorly. From above, the carapace of *Peucetia* is much more lyeosid in form than that of *Oxyopes* or

Hamataliwa. The face is vertical. Sides of carapace and thoracic declivity not so steep as in *Oxyopes* and *Hamataliwa*, and the eyes of *Peucetia* occupy a comparatively smaller area than in either of these genera.

Labium much longer than wide. Endites very long, slightly enlarged distally and greatly exceeding the length of the labium, converging in front of it.

Abdomen very elongate, almost cylindrical, tapering gradually behind to the spinnerets.

Legs very long in comparison to body length, with many conspicuous black spines. Order of leg length I-II-IV-III.

Integument free of hair except for white hair in eye region. Predominate color of integument is green or shades of green in the living spider. Color is changed rapidly in alcohol.

Male palpus with characteristic paracymbial process in each species, sometimes partly broken off during mating. Palpal sclerites, very similar in the species of *Peucetia* examined (Figs. 154, 155 and 158-161).

Epigyna of females more variable. In all species examined the epigynum is covered or plugged with a hard black matrix, deposited during or immediately after mating.

Peucetia viridis (Blackwall), type-species of the genus, is quite similar to the two species described from the United States.

PEUCETIA VIRIDANS (Hentz)

Figures 136-148. Map 5.

Sphasus viridans Hentz, 1832, Amer. Jour. Sci., 21:105. Syntypes from North Carolina and Alabama, lost.

Clastes abboti Walckenaer, 1838, Hist. Nat. Insectes Aptères, 1:579. Holotype from Georgia, Abbot figure 401.

Clastes viridis Walckenaer, 1841, *ibid.*, 2:475. Holotype from Georgia, Abbot figure 406.

Clastes roseus Walckenaer, 1841, *ibid.*, 2:476. Holotype from Georgia, Abbot figure 411.

Oxyopes viridans: Hentz, 1845, Jour. Boston Soc. Nat. Hist., 5:195, pl. 17, fig. 2, ♀. 1875, Occ. Pap. Boston Soc. Nat. Hist., 2:46, pl. 7, fig. 2, ♀.

Peucetia aurora McCook, 1883, Proc. Acad. Nat. Sci., Philadelphia, p. 277. *Ibid.*, 1890, 2:147, figs. 180, 181. Female holotype from San Bernardino, California, in the Philadelphia Academy of Natural Sciences.

Peucetia viridans: Emerton, 1902, Common Spiders of the United States, p. 89, fig. 220, ♀. Comstock, 1913, The Spider Book, p. 658, figs. 734, 735, ♀; *op. cit.*, rev. ed., 1940, p. 666, figs. 734, 735, ♀. Petrunkevitch,

1929, Trans. Connecticut Acad. Arts Sci., 30:106, figs. 89-91, ♂, ♀.

Gertsch, 1949, American Spiders, p. 212, pl. xvii, pl. 31, ♂, ♀.

Peucectia abboti: Chamberlin and Ivie, 1944, Bull. Univ. Utah, (9)35, Biol. Ser. 8(5):134.

Discussion. This species was described under three names applied by Walckenaer (1838, 1841) to the Abbot drawings. The name *Peucectia abboti* was resurrected by Chamberlin and Ivie (1944), but *Peucectia viridans* (Hentz) has priority. *Oxyopes fossanus* Walckenaer, a still earlier name for *P. viridans*, is designated a *nomen oblitum*. The reasons for this are discussed under the section on Walckenaerian names.

Structure. Length of 30 females 11.8-21.6 mm, mean 16.2 mm; length of 30 males 8.3-14.5 mm, mean 11.9 mm. Order of leg length I-II-IV-III. For comparison of diagnostic measurements of *P. viridans* with those of *P. longipalpis*, see Table III.

Color. The vivid green pigment of *Peucectia viridans* washes out rapidly in alcohol, and, therefore, descriptions of the specimens in alcohol are preceded by a short note on these spiders as they appear in nature.

Female. Pattern illustrated in Figures 136 and 137. This pattern is characteristic of well-marked individuals from Arizona and is life-like. Eye region with black bands extending toward center of hexagon. Eye region clothed with white appressed hair. An occasional alcoholic specimen has the eye region red and this is probably the coloration in many living spiders. The face and the entire cephalothorax are a bright, translucent green in life. They are also devoid of hair except in the eye region. The color fades first to a pale green, often with a yellow cast, then becomes pale yellow-orange and sometimes dark yellow-orange. Many parts of the cephalothorax become almost cream in color. Lighter stripes of cream often visible from AME to lower edge of clypeus, which is also often cream colored. Margins of chelicerae usually lighter in color. Sockets of cheliceral condyles at lower margins of clypeus are black.

Specimens from the eastern United States have a pair of bristles one-third the distance from lower edge of clypeus to AME, with distinct black spot at base of each (Fig. 140). A similar pair of bristles with black spots occurs one-third the distance from base to distal ends of chelicerae. In western specimens the bristles are present, but there are no accompanying black spots at the base.

Carapace in alcoholic specimens yellow-orange, tinged with green or faded yellow-green with alternating dark and light

bands radiating from thoracic groove. In life the carapace is bright translucent green.

Dorsum of abdomen in living spiders is a bright green with contrasting chalk white markings. The color of the abdomen usually does not fade as rapidly as that of the cephalothorax. In alcoholic specimens the dorsum of abdomen is usually a faded yellow-green or pale green. A translucent, green, cross-shaped mark over the cardiac region, sometimes outlined with white (Fig. 137), is usually present. Often there is a series of four white chevrons beginning at the cardiac region and continuing posteriorly. These chevrons may appear as white spots or bars, and sometimes are reduced to only two pairs near the cardiac region. The median green of the dorsum bordered by white (particularly in specimens from the Southwest), or pale green. Sides pale green with a longitudinal white stripe along ventral edges, often occurring in specimens from the Southwest. Venter with median longitudinal stripe of green, heavily pigmented with white and bordered by white stripes or the median longitudinal stripe of chalk-white pigment. Lateral areas pale green to the ventral longitudinal white stripes along sides.

In the living spider the femora are pale green with the more distal segments lighter greenish yellow. Femora with many large black spots (Fig. 138). Black spots at the base of spines on tibiae in specimens from the eastern United States and those from California. Specimens from the Southwest do not usually have these black spots on the tibiae. The legs in living *Peucetia* are often banded with bright red, and there may be red spots over the body as well. Legs in preserved specimens, dark to pale yellow-orange, occasionally tinged with green.

Labium, endites and sternum green in the living lynx spider. In alcoholic specimens the labium is pale yellow-orange, tinged with green. Endites usually cream or pale yellow-orange without green tint. Sternum pale green.

Male. Pattern illustrated in Figures 141 and 142. In life, the male is a vivid translucent green over the entire cephalothorax and abdomen. Eyes with black bands extending toward center of hexagon. Eye region covered with appressed white hair. In museum specimens the variation in color of the cephalothorax and abdomen of the male is very similar to that of the female. The white chevrons or spots on the abdomen are usually not as conspicuous in the male.

The legs, labium, endites and sternum are the same in color as those of the female.

Diagnosis. *Peucedtia viridans* is the most widely distributed oxyopid in this study. It is sympatric over part of its range with *P. longipalpis*, another green lynx spider. These two species are very much alike in color and general appearance as far as I can determine from preserved material. I have not seen *P. longipalpis* in the field. In southern Texas and Arizona, where these two species occur together, *P. longipalpis* has often been mistaken for *P. viridans*. It is also interesting that in a dozen or more vials these two species were mixed, indicating that they occur in close proximity. No differences in ecology have been noted.

The genitalia of *P. viridans* are very distinct from those of *P. longipalpis*, particularly in the males (compare Figs. 158-161 with Figs. 154, 155). In *Peucedtia viridans* the legs are much larger in proportion to body size than in *P. longipalpis* (Table III). The male palpus and female epigynum of *P. bibranchiata* (Figs. 149, 150 and 156, 157) are illustrated for comparison with *P. viridans*. From a preliminary study these appear to be separate species, but larger collections, particularly those containing males and females collected together will have to be examined before this is certain. *Peucedtia bibranchiata* is found in southern Mexico and Central America.

Natural history. More is known of the natural history of *P. viridans* than of other oxyopids of North America, because of its large size and conspicuous color. Gertsch (1949) reports that many of the western specimens of *P. viridans* inhabit the dull green foliage of wild buckwheat (*Eriogonum fasciculatum*) and that the egg cases are frequently seen near the yellowish flower of this woody shrub. Gertsch (1949) also reports distinctive color variations in *P. viridans*. In Texas I have collected *P. viridans* by sweeping tall grass and weeds in pastures, open fields, and prairie. Egg cases were found in tall grass with the heads of several stems tied together for their attachment. In each instance the female was in close proximity to the egg case.

One female of *P. viridans* was found with its egg case attached to the leaves of an Ash tree (*Fraxinus*). This female and its egg case were collected and observed for several weeks. During this time the female remained in close contact with the egg case. The female guarded the egg sac with great vigor, and when a pencil was poked at the egg case, she left the impressions of her fangs in the soft graphite end. W. H. Whitcomb (1962) has recently reported on egg sac construction and oviposition in *P.*

viridans. A horizontal disk is constructed, and a bowl with an opening on the bottom is built under this disk. The eggs are forced upward into the bowl, the opening closed, and the egg sac completed.

Egg cases of *Peucetia viridans* are encountered more frequently than are the smaller egg sacs of *Oxyopes* or *Hamataliwa*. These egg sacs are rounded, from 1.2-2.5 cm in diameter, flattened on one side and, except in the Southwest, have pointed projections on the surface. The contents of nine egg cases of *P. viridans* with their localities were as follows: three from Florida contained 172 embryos, 189 eggs and 302 embryos; one from Arkansas contained 602 eggs; two from Arizona contained 197 embryos, and 231 eggs; two from Veracruz, Mexico, contained 129, and 158 eggs; and one from Cuba contained 313 spiderlings. *Peucetia*, as expected, produces a great many more eggs than *Oxyopes* or *Hamataliwa*.

The mating behavior of *P. viridans* has not been recorded. The examination of preserved material has revealed several interesting facts. In the great majority of preserved females the epigynum was plugged with a hard, black material, easily removed with a dissecting needle. This material is obviously deposited during or immediately after insemination. Usually imbedded in the material and inserted in the openings of the epigynum are found the two-pronged portion of the paracymbium of the male palpus (Fig. 160). This twin-branched part of the paracymbium of the male palpus is absent in many specimens, indicating that these males have mated. The plugging of the female epigynum and the loss of the paracymbial process of the male apparently occur invariably during mating. These interesting devices appear to prevent further mating by the male, as well as the female. The male with two palpi can, of course, mate twice.

In *P. longipalpis* the paracymbium of the male is not broken off during mating, but the epigynum of the female is closed by a hard plug as in *P. viridans*. The selective advantage of this device that prevents further mating in *P. viridans* is purely conjectural, but it may have been selected for as an isolating mechanism to prevent interbreeding between two closely related sympatric species. It is also possible that the breaking of the male's paracymbium is the by-product of an act of copulation that insures fertilization of the female.

Distribution. Southern United States, Mexico, Central America and the West Indies (Map 6).

Records. *Virginia.* Nansemond Co.: Holland, 22 July 1945, ♀ o (Buckholz). *Tennessee.* Wilson Co.: Cedars of Lebanon St. Pk., 12 Aug. 1951, ♂ (T. Cohn). *North Carolina.* Carteret; Craven; Duplin; Durham; Orange; Perquimans; Robeson; Wake. *South Carolina.* Bamberg; Charleston. *Georgia.* Baker; Clarke; Lowndes; Rabun; Thomas; Ware; White. *Florida.* Alachua; Bay; Desoto; Escambia; Gadsden; Lake; Marion; Okaloosa; Orange; Pinellas; Polk; Volusia. *Alabama.* Baldwin; Cleburne; Hale; Houston; Lee; Madison; Mobile; Monroe; Montgomery; Tallapoosa. *Mississippi.* Forrest; Madison; Oktibeha; Warren. *Louisiana.* Ascension; Caddo; East Baton Rouge; Natchitoches; Red River. *Arkansas.* Hempstead; Washington. *Kansas.* Cowley Co.: Winfield, ♂. *Texas.* Aransas; Atascosa; Bexar; Brazos; Cameron; Coryell; Dallas; Hidalgo; Jim Wells; Leon; McLennan; Montgomery; Polk; Sutton; Travis; Walker; Zavala. *Arizona.* Cochise; Pima; Santa Cruz. *California.* Lassen; Los Angeles; Riverside; San Bernardino; San Diego; Santa Barbara.

MEXICO. Tamaulipas; San Luis Potosí; Nuevo Leon; Coahuila; Zacatecas; Chihuahua; Durango; Nayarit; Baja California; Veraacruz; Hidalgo; Puebla; Morelos; Guanajuato; Jalisco; Michoacan; Guerrero; Oaxaca; Chiapas; Campeche; Yucatan.

HONDURAS. 27 Km S of Teguilgalpa, 12 Oct. 1945, ♀ (A., M. Carr).

NICARAGUA. Santa Maria de Ostuma, Nov. 1959, 3 ♀ ♀ (NLIHK).

COSTA RICA. Monteverde, Puntarenas, Feb. 1960, ♀, 18 Nov. 1960, ♂ (C. W. Palmer).

PANAMA. Boquete, Chiriquí, Dec. 1946, 4 ♀ ♀; Cerro Pena near El Valle, Sept. 1946, ♂ o (NLIHK).

CUBA. Habana: Havana, 4 ♀ ♀ :700 (F. Cervera); Miramar, 16 Sept. 1951, ♀ (M. Burro); Santiago de las Vegas, ♀ (NB). Las Villas: Soledad, 8 June 1925, ♂ (G. Salt), 3 Aug. 1931, ♂ oo (L. G. Worley), July-Aug. 1932, ♀ o (G. B. Fairchild), 15 Aug. 1930, ♀ (R. P. Dorr). Oriente: Chirivico Harbor, 2-4 July 1955, ♀ (AFA); El Cristo, 3 Oct. 1913, o; Ensenada de Mora, 17 Apr. 1939, ♀ coast below Pico Turquino, 1936, o (PJD). Pinar del Rio: Punta San Juan, 17 July 1947, ♀ (W. L. Nutting); Vinales, 1917, ♀; 7 Km N of Vinales, 16-22

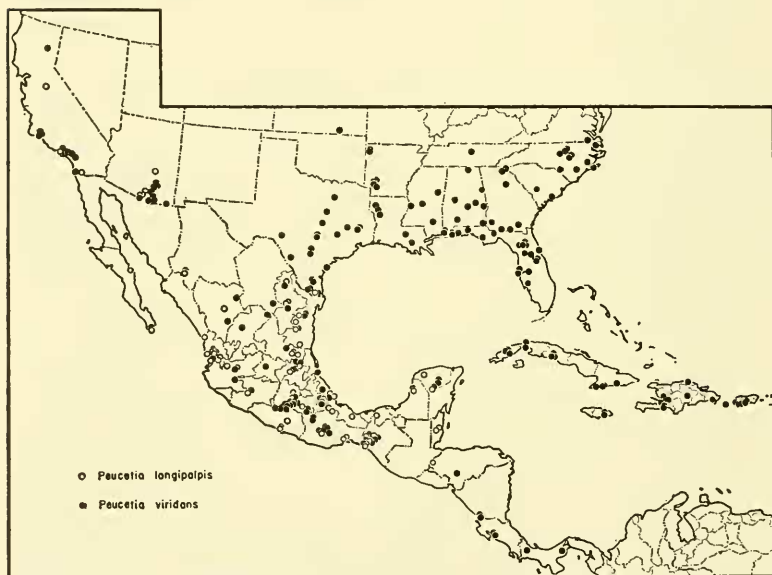
Sept. 1913, ♂ ♀ :400; 14 Km N of Vinales, 16-22 Sept. 1913, o.
 JAMAICA. Hope Botanic Gardens near Kingston, 22 Feb. 1911, ♀ o.

HAITI. Bizeton, 9 Jan. 1922, ♀ ♀ o; Carrefour, 7 Jan. 1922, ♀ (FEW); Furey, ♀ (W. M. Mann); Kenskoff, ♀ o; Port-au-Prince, ♂, 30-31 Dec. 1921, ♀ (FEW); 25 Km N of Port-au-Prince, 5 Sept. 1934, o (PJD); Trou Caiman, 4 Sept. 1934, o (M. Bates).

DOMINICAN REPUBLIC. Constanza, Aug. 1938, 3oo (PJD); La Romona, 31 July 1935, ♂ (Hassler); Puerto Plata, Apr.-May 1941, 4 ♂ ♂ :400 (D. Hurst).

PUERTO RICO. Guanica, 3oo; Guayanilla, ♀; Mayaquez, 15-16 Feb. 1914, o; Ponce, ♂ ♀ oo.

MONA ISLAND. Aug. 1944, 3oo (H. Beatty).



Map 6

PEUCETIA LONGIPALPIS F. O. P.-Cambridge

Figures 151-155. Map 5.

Peucetia longipalpis F. O. P.-Cambridge, 1902, *Biologia Centrali-Americana*, Arachnida, 1:340, pl. 32, fig. 11, ♂. Male holotype from Amula, Guerrero, Mexico, in the British Museum (Natural History), examined.

Discussion. F. O. P.-Cambridge (1902) recognized the male of *P. longipalpis* as a species distinct from *P. bibranchiata* F. O. P.-Cambridge. The female of *P. longipalpis* is figured here for the first time.

Structure. Length of 30 females 12.5-19.6 mm, mean 15.8 mm; length of 30 males 8.1-14.5 mm, mean 11.5 mm. Order of leg length I-II-IV-III. For comparison of certain diagnostic measurements of *P. longipalpis* with those of *P. viridans* see Table II.

Color. There is a good deal of variation in the color of specimens of *P. longipalpis* in alcohol. The following descriptions are based on alcoholic specimens that appear to have retained some of their original pigmentation. In this species, as well as in *P. viridans*, it is difficult to determine the range of color variation in the living animal from preserved specimens because of the alteration produced by the alcohol. The variation in museum specimens is probably greater than that of these spiders in nature.

Female. Eyes with black bands continuing toward center of hexagonal eye area. Eye region clothed with white appressed hair. Face pale orange-yellow with green tinge at lower edge of clypeus and along the margins of chelicerae. Black spots at base of bristles on clypeus and near base of chelicerae as in eastern specimens of *P. viridans*, except that the spots are much smaller in *P. longipalpis*.

Carapace orange-yellow, pale green along sides. The cephalothorax is probably translucent green, like *P. viridans*, in life.

Dorsum of abdomen concolorous, pale green with a thin translucent cross-shaped mark not as conspicuous as that of most specimens of *P. viridans*. White spots and bars on dorsum are apparently absent in *P. longipalpis*. Underlying white pigment shows through the green, especially along the median area; this pigment often makes the abdomen appear white with a green cast. In some specimens the abdomen has presumably faded to a bright yellow. Venter of abdomen with a broad median stripe of chalk-white with greenish tinge. Bordering this stripe is pale green, becoming darker green laterally. No longitudinal white stripes along sides as in many specimens of *P. viridans*.

Legs yellow-orange. Femora with many black spots, but these are usually smaller and less conspicuous than in *P. viridans*. Black spots at base of tibial spines as well.

Labium and sternum pale green. Endites cream, shaded with green.

Male. Coloration very similar to that of the female described above. Palpus yellow-orange with sclerotized portions dark brown.

Most of the males have the abdomen concolorous, pale green to almost white, suffused with green. The cardiae region with only a thin translucent cross-shaped mark. White spots and bars not present on abdomen.

Diagnosis. *Peucectia longipalpis* is probably very similar in appearance to *P. viridans* in the field. Specimens of *P. longipalpis* are approximately the same size as *P. viridans*. The legs of *P. longipalpis* are, however, much shorter in proportion to body length (Table III). These two species are readily separated by the differences in genitalia (compare Figs. 151-153 with Figs. 143-148), and Figs. 154-155 with Figs. 158-161).

Natural history. *Peucectia longipalpis* is often collected with *P. viridans* where the ranges of these two species overlap (Map 6), indicating that they occur in similar or adjacent habitats. These two species will probably be readily distinguishable in the field once their habitat preferences or their respective niches are recognized. Nothing is known of the habits or habitat of *P. longipalpis*.

Distribution. Southwestern United States, south to British Honduras (Map 6).

Records. *Texas.* Cameron Co.: Harlingen, ♀; Harlingen, 8 Oct. 1945, ♂ (D. E. Hardy). *Arizona.* Gila Co.: Parker Creek Wildlife Exp. Stn., 9 Oct. 1959, ♀ (JAB). Pima Co.: Baboquivari Mtns., Brown's Canyon, 9 June 1952, ♂ ♀ ♀ oo (MAC, WJG, RS). *California.* Los Angeles Co.: Los Angeles, ♂ ♀ (NB). San Diego Co.: Lyons Valley, 30 May 1947, ♂ (WMP). Toulume Co.: 5 mi. N of Priest, 8 July 1958, ♂ (WJG, VDR).

MEXICO. Tamaulipas; San Luis Potosi; Nuevo Leon; Coahuila; Chihuahua; Durango; Sinaloa; Nayarit; Baja California; Veraacruz; Hidalgo; Puebla; Morelos; Jalisco; Michoacan; Guerrero; Federal District; Oaxaca; Chiapas; Tabasco; Campeche; Yucatan.

BRITISH HONDURAS: El Cayo, Sept. 1959, ♀ ♀ (NLHK); Never Delay, Aug. 1959, ♀ (NLHK).

LIST OF COLLECTORS

| | | | |
|-----|--------------------|------|-----------------------|
| AFA | A. F. Archer | JNK | J. N. Knull |
| AMC | A. M. Chickering | LID | L. I. Davis |
| AMD | A. M. Davis | MAC | M. A. Cazier |
| ARB | A. R. Brady | MG | M. Goodnight |
| BM | B. Malkin | MHI | M. Hite |
| CG | C. Goodnight | MN | M. Nirenburg |
| CRC | C. R. Crosby | NB | Nathan Banks |
| CSB | C. S. Brimley | NLHK | N. L. H. Krauss |
| CV | C. Vaurie | PJD | P. J. Darlington, Jr. |
| DCL | D. C. Lowrie | PV | P. Vaurie |
| DLP | D. L. Pallister | RHC | R. H. Crandall |
| FEW | F. E. Watson | RS | R. Schrammel |
| GN | G. Nelson | SEJ | S. E. Jones |
| HD | H. Dietrich | SM | S. Mulaik |
| HFE | H. Exline Frizzell | THH | T. H. Hubbell |
| HKW | H. K. Wallace | VDR | V. D. Roth |
| HWL | H. W. Levi | WI | W. Ivie |
| JAB | J. A. Beatty | WJG | W. J. Gertseh |
| JCP | J. C. Pallister | WMP | W. M. Pearce |
| JHE | J. H. Emerton | | |

This list includes the names of collectors who have collected at two or more localities. Before each name are the initials used to designate that collector in the records of specimens examined. Names of collectors who have collected at only one locality are written in full with the records.

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